APA-TECH

SO, WANT TO COME OVER TO MY PLACE & LOOK AT SOME EXPLOSIVE CARCINOGENS?
AKavanagh
1989

CHEMISTS' DAYDREAMS...

APA-TECH 63

The Amateur Press Association for General Technics

G.T. Buckfast + Shalmaneser
Greg Ruffa, 1004 Seventh St., S.E., Apt. 103,
Minneapolis, Minn. 55414 (612)-379-9622

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The minimum activity required is six pages per year (**not** including frankings).
The copy count for the APA is twenty (20).
The deadline for **APA-TECH 64** is Saturday, April Fools' Day (no, really!), 1989.

Final Countdown Department:
Unless we hear from you, this will be the last issue for **Bob and Connie;**
the next issue will be the last for **Dave L., Donna and Tullio** (!), and **Guy W.**

And we'd **still** like to get some covers from outside of Minneapolis (please?).

Your account, before I started licking stamps, stood at: $5.62

ROSTER

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I'm looking forward to seeing at least some of you folks at Capricon soon and at Minicon next month. That'll probably be it for me at non-technical conventions until autumn...

As a reminder, the $2 dues for this year have been deducted from your accounts, so a few of you are pretty low on funds. More important to me than that, though, is that I'd like to hear from more of you. Those of you being menaced are those who haven't been heard from in a year or more and whose accounts are just about empty. We'd all miss you around here...

I am changing the "minac" requirement to something more like the actual situation. I figure it will make no difference to the "regulars," but may get some of our less frequent contributors to write at least once a year. Covers may be counted for up to two pages toward this minimum.

That's all for now. Take care and see ya around!

Shal.

****
****
***   Der Mann von Druben
        ***
***   by Joachim Schurmann
            ***
***
                    ***
***   January 1, 1988
            ***
****
****

I am writing this document at Ishercon on Phil Folio's Macintosh. I am not an experienced Mac user. This document will therefore be much less fancy than it could be. However please indulge me if I am using one of Phil's unusual fonts.

You have not heard from me for some time. This was due to several reasons, first and foremost to the fact that my PC in Milan actually contracted a virus.

A Computer Soft-Mare...

No matter what the next guy says, there are such things as computer viruses. One sunday afternoon I got frustrated with something and bought myself some cheap Personal Computer magazines with attached software. These magazines are widely available in Italy and really are little more than somewhat fancy zines. Normally they include some floppies with freeware and shareware somebody obtained abroad and brought into the country. In my case I obtained one floppy with utilities and one floppy with various games. I mounted them both and used some of the software for the next several weeks.

Well, one friday afternoon my PC, a COMPAQ II, failed to reboot. This is the PC I am using for business, therefore it is a quite important tool for me. An immediate test showed me that sector 83 on my hard disk was gone. To make a long story short, I ended up spending the better part of the following weekend, a beautiful day in Reggio Emilia, going through my hard disk recuperating and putting files together again.

Don't misubderstand me: I am making regular backups. However my backups are monthly and much of the data had been updated since then. I also wanted to do more than just restore the lost data. I wanted to catch the "whatever" that ruined my data. I found that virus busting is an extremely time consuming business. Therefore I had to limit myself to just assess the damage and selectively restore the data required. For the record I must therefore state that I have not physically caught the virus, and therefore, technically, I can neither claim nor prove that I was dealing with such a critter. All my claims are solely based on circumstancial evidence.

Sector 83 with the main directory was ruined, however the F(ile) A(llocation) T(able) luckly was left intact. Since tha FAT contains all the needed information about file extensions and their physical locations, the consistency of the files themselves was not breached. However details like file names, types and versions were irremediably gone. I also checked track 83 for possible physical damage: there was none. I forced the system to write on that track overriding all system's warnings and succeeded. Then I created bogus entries in that directory, tied all the files from the FAT that seemed to be relevant to these entries and ran a backup of all files thus restored. Of course I am aware that this backup might contain the virus. Therefore the backup is kept in a box with a red virus warning label.

Next I reinitialized the hard disk and the operating system from the original manufacturer's floppy and selectively moved necessary files from the backup to the hard disk. Since I had no file names to go by I had to physically search and review the content of the files in order to find the files I needed. This way I also reduced the risk of inadvertently copying the probable virus back into the system. Of course I reviewed all executable software extra carefully. Wherever possible, I copied it from a backup that preceded the installation of the suspected programs.

Several pages of notes that were the basis for my next contribution are still in the backup. I did not find the time to untangle it from the rest of the files and store it again on my active hard disk. However the next business day my PC was operational.

A reading experience...

Another reason for my being relatively "incummunicado" was the book I recently read. A true reading experience. I would like to recommend this particular book to everybody who is interested in this genre:

> Experiments with Truth
> by
> Mohandas K. Gandhi

This book is an autobiography that covers the time from Gandhi's youth up to the years of his pacifistic activism. The book is fascinating because it presents Gandhi as a human being, with all the doubts inherent in his decisions. It is also a book of teachings: in his own doubts we find many guidelines for understanding issues and problems of our day to day life. After starting this book I was literally unable to pick up anything else before having finished it. I also think that this book is a great intersection between the Indian and the European culture. Much of the text was translated directly by Gandhi from the original language to English and thus presents a very reliable rendition of the original text.

The End...

I am far from being out of things to say, but it is time for me to wrap up. There will be soon more news from overseas, but now I need to wrap up. People are getting ready to leave and I still need to say

GOOD-BYE.

CRUMBCRUNCHERS, INC.

being a harried missive emanating from 501 Main St., Ripley, Ohio 45167, where Dave Powell
and Susannah West can be found, when they are not someplace else.
Mail received in P.O. Box 98 and telephone conversations listened and responded to at
513-392-4549

Late January 1989

Christmas clutter (most of it, anyway,) has finally been stashed away, and we are back at our usually hectic routine, which was interrupted by the even hecticer hecticness of the holidays. Dave started his last semester of school January 6, and we are deep into international finance and marketing. Classes end in late March and graduation is May 15. We're still waiting to find out his marketing grade. He took the final December 10, but the prof at last query still hadn't turned in the grades. So when Dave got his "official grades" from the registrar, all it said for Marketing was the credit hours in parentheses.

We attended Ishercon this year, and had an enjoyable time. Thank you very much, Donna and Tullio, for your hospitality.

Thank you also, everyone who filled out our survey. We appreciate your suggestions and advice! Work on STARWIND is progressing nicely. Having Marlene home all day recovering from a cold and various infections really made working a bit harder than usual. She's back in daycare three days a week now, and I'm getting a good bit more work done!

Also at Ishercon, Marlene was glad to renew her friendship with Rachel. Next time, though, we'll be sure to bring along lots of kids toys! If you were there, you may have observed her fascination with CATHEDRAL. I think this is because we got a game called FEUDAL as a gift this year, and she observed the similarity. The FEUDAL game, though, I think, has several pieces missing, and has probably been passed from family to family for quite awhile!

I'm including an article on the "micropress" which comes from a newsletter called *Ohio Writer*. I thought it was interesting and hope that it photocopies okay! We got a rather interesting "micropress" publication out of the blue the other day. I noticed that it was published in Kent, Ohio , and figured that my name had gotten on the mailing list because of *Ohio Writer.* It was weird, especially a piece (apparently a continuing feature) about a character named Adam Alligator. A letter to the editor observed that Adam Alligator seemed "drug-induced."

* *

Well, *Sesame Street* has about 20 minutes yet to go, so I'd better be drawing this to a close. Though I can't find the most recent APA, I'll try to make some comments from memory!

Greg: Children's ability to "do" a museum in a very short time doesn't apply to the gift shop at all! No matter how bored they've been by the museum, they're able to spend an *interminable* amount of time in the gift shop. They'll want to stay long after the grownups are getting very impatient and bored in their own turn. (Of course, if there are mostly books or other grown-up things, they won't be so interested, but if there are lots of educational toys, games and other knick-knacks, whether for children of adults, they will spend *ages* examining them.) It gets embarrassing after awhile, especially when the salespeople begin to glare, wondering whether you're going to buy anything!

Of course, if everything is displayed at the adult level rather than a child's, you can get out quicker. They may be just as fascinated by the boxes stored beneath the counter, though! This makes me think of an early Peanuts cartoon in which a very young Lucy goes to a ten cent store with an older friend. She's not tall enough to see onto the display tables, so she spends her time studying the wood the tables are made of, saying things like "My, doesn't this wood have a fascinating grain?"

Guy: It was very good to talk to you on the phone! Keep us posted on the progress of *Turn Left at Orion!* Will the book be available in the U.S. or not?

I was pleased to learn that St. Francis de Sales is the patron saint of writers! It's interesting to know that one's profession has a patron saint!

Bill: In rummaging around in old APAs, I read your comments on "mince." I've discovered another variation - it's called "pea wiggle" and is frequently eaten in the West family. It's browned ground beef, a chopped-up onion, and true to its name, either canned or frozen peas. I'd forgotten about it until my Oregon aunt fixed it for lunch one day when MR and I were visiting. I used to think that pea wiggle belonged to our family alone, but it probably doesn't. (I also used to think that "slumgullion" belonged to us too, until I found it in a cookbook!)

* *

Well, I seem to have run out of room before I was able to talk to all the people I wanted to talk to!

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November/December 1988

Micropress

What is micropress? As the saying goes, I can't give a definition of it, but I know it when I see it.

It is possible, however, to list some distinguishing characteristics (we might follow John Henry Newman and call them "Notes") of the small press, as opposed to the micropress. For example:

•A small press book or magazine is not photocopied.

•A small press book or magazine is typeset. Sometimes the name of the typeface is given.

•A small press book or magazine lists its editors, and sometimes also its advisory board or contributing editors, on its title page.

•A small press book or magazine *has* a title page, which can be found with a minimum of searching.

•A small press book or magazine states on its title page: "Published by the (So-and-So) Press," and gives the address.

•A small press book or magazine does not change its address every three months.

•A small press book or magazine gives its publication schedule, and in most cases actually sticks to it.

•A small press book or magazine expects to receive what it calls "unsolicited manuscripts," and therefore states on its title page complicated and arbitrary rules for dealing with them.

•A small press book or magazine publishes arrangements of the letters of the alphabet which it calls "poetry," "fiction," "essays," and "criticism."

•A small press book or magazine will often print brief biographies of its contributors. The words "teaches at" will frequently appear in these biographies.

While the "Notes" of the micropress might include these:

•A micropress book or magazine is published by Kinko's Copy Shops. Its publication schedule is irregular, and depends on whether somebody knows somebody at Kinko's who can slip some free photocopying past the manager.

•The typefaces of the micropress book or magazine are those of the interesting assortment of obsolete and partly-working typewriters on which the manuscripts were typed (or retyped). Sometimes the micropress book or magazine is hand-printed. The layout is often collage-style. Photographs, found texts, and graphics are often incorporated.

•The address of the micropress book or magazine is that of the apartment of the person who did the final assembling of the micropress book or magazine. This person will usually have moved to a different apartment (if not city or state) within three months.

•A micropress book or magazine does not know what an unsolicited manuscript is. If you've heard about it, you're probably contributing to it, unless you just haven't gotten around to sending anything out yet. Micropress books or magazines are put out by loosely-connected groups of friends and acquaintances, and circulate on the principle of round-robin letters. (That is, I'm putting one out this month that's going to have some of your stuff in it, and you're putting one out next month that's going to have some of mine in it.) Some (like Frank Kogan's publications) actually are set up as round robins. This is not to say that micropress books or magazines print everything they receive. Sometimes you get a nice letter back saying "I'm not sure what to do with this; maybe you should send it someplace else."

A pompous way of expressing this distinction is that the small press binary categories of editor/contributor and acceptance/rejection give way to the micropress pluralisms of network, circulation, and do-it-yourself. A less pompous way of expressing it is that there is no point in being exclusionary in a micropress, since anyone you exclude probably has a friend who works at Kinko's too, and therefore the same chance of getting their stuff out that you do. Of course, this means that publication in a micropress confers absolutely no social standing, since no one was excluded from publication in favor of those who made it, and therefore no one wins anything by being published, or gets one over on anybody else, or winds up with anything somebody else doesn't have.

•A micropress book or magazine prints arrangements of the letters of the alphabet too. But what exactly they are is generally not so tidily defined as in the small press book or magazine. Some of the arrangements of the letters of the alphabet are in fact termed "poetry" by those who produce them, who may be quite serious about calling them poetry, and about the craft which they consider themselves called to practice. And in general there is no point in calling the micropress "anti-literature" or anything of the kind. Micropress is "anti-literature" or "non-literature" only by a definition of literature which also excludes such writers as Raymond Queneau, Dick Higgins, Jack Kerouac, and Tristan Tzara. (Of course, it is quite easy to produce a definition of literature which will do just that.)

Much of the micropress is experimental. But, in addition to the number of publications which fit the standard definition of experimental (generally formulated as "I can't make heads or tails out of this stuff," but sometimes also as "Wow! That's weird!"), there are a growing number which concentrate on direct, personally written, often first-person realistic tales or anecdotes, usually short, in

(continued on page 11)

Micropress *continued from page 1*

which a conscious effort is made *not* to transmute the material into the usual well-wrought unity of symbol and technique. In which the goal is transcription or documentation, almost as if the writers are their own oral historians. Micropress is the natural home of this type of writing. Not because it is too opaque for the larger presses, but because it is too quick, too unpremeditated, for it to wait around accumulating polished form, rejection slips, and "aura." The impulses to write it and to transmit it are not separated, and micropress is almost as quick and cheap a means of transmission as three dozen long distance phone calls.

This sounds solipsistic. But I don't think there is anything solipsistic about the following (reasonably typical) paragraph:

> —The bed, unlike my last employer, never complains if I am fifteen minutes late, or leave fifteen minutes early. Sleep is sleep. Work is the 13 minutes it takes to fry chicken, the 2 before the hamburgers need to be flipped. Work is also table six needs coffee instantly, but not before table eight has water brought to them after which the tub at the waitstand needs to be changed. Sleep is not sequential, and so three days after I quit my job, I unplugged the clock.
>
> **(Laura Creedle, from "The Best of Lobster Tendencies")**

It has to be said, as well, that micropress is full of vigorous, crude, confusing, half-finished, badly-spelled, and semigrammatical stuff that's all been done before. As opposed to small press, which is full of limpid, elegant, perfectly-spelled, timid, boring, tame, and pointless stuff that's all been done before.

•Micropress books or magazines seldom print biographies of their contributors, whose occupations tend to change as rapidly as their addresses. But a representative sample (taken from Randy Russell's *American Job #1*) includes bookstore clerk, dishwasher, truck unloader, office cleaner, warehouse worker, janitor, and pizza deliverer (these first seven are all Randy's), legal editor, telephone interviewer for a marketing research company, camera store clerk, night gas station attendant, lint cleaner for a laundry company, parking lot attendant, secretary for a university astronomy department, worker in a shelter for the homeless, investment banker, case manager for a community mental health center, and, of course, clerk at Kinko's Copy Shop.

•Finally, small press magazines tend to have names like *Grand Street, Antaeus, Field, The Iowa Review, The Kenyon Review, Tri-Quarterly, Stand, Descant*, and *Poetry*, while micropress magazines tend to have names like *Cool Art Weekly, Lobster Tendencies, Phobia, Helium Ravings, White Wall of Sound, Time Worm: The Magazine for Misfits, Counter Culture: The Magazine of Diner Appreciation, The Sweet Ride*, and *Why Music Sucks*.

Like I say, I know it when I see it.

• • •

But further questions of classification remain. Where exactly is the dividing line? Are the chapbooks poets frequently self-publish (which are often cleanly laid out and typeset) small press or micropress? What about local poetry/fiction magazines which accept/reject manuscripts, and go for the highest production values they can afford, but which tend to draw from a small circle of writers known to one another? And should large-scale, long-continued, and nationally known projects like Luna Bisonte Prods and Xexoxial Endarchy be still considered micropress? (Xexoxial Endarchy owns its *own* copy machine.) These questions should all be carefully decided, and I recommend them to the tribes of nit-picking Joyce and Pound scholars thrown out of work by deconstruction industry, or just in need of a break.

I can only finish by listing a few sources and (possibly) current addresses of micropress publishers known to me—far from a complete list. And by saying that micropress completely and forever changed the way I write. For which I will always be glad.

Some Micropress Sources and Publishers I Happen to Know About:

Factsheet Five
6 Arizona Ave.
Rensselaer NY 12144
--$2 per issue; subscriptions accepted for up to 4 issues in advance.

Many pages of 1-paragraph reviews of micropress from around the country. Very complete. The best source around for names and addresses of publications. Reviews, however, sometimes seem to depend on which side of the bed the reviewer got out of that morning.

Denise Dee
29A Guy Place
San Francisco CA 94105

Published (with Michael Kaniecki) the seminal and essential *Lobster Tendencies*. After Kaniecki's departure, continued with *Closest Penguins* and a recent series of single-theme chapbooks. Current publication is *Connection and Separations* ($1 per issue). In contact with many other micropress publishers; reviews in her magazines are a good source of information.

Frank Kogan
3352A 26th St.
San Francisco CA 94110

Spin and *Village Voice* writer who published two round-robin magazines, *Why Music Sucks* (obsessive argumentation among rock music writers, some quite well known) and *Reader's Poll* (answers to questions dreamed up by Frank and his correspondents, e.g., "How much $5.98 is?" and "What would have happened if Japanese instead of Africans had been brought to the U.S. as slaves?"). Much fun. $4 to non-participants.

Xexoxial Endarchy
1341 Williamson St.
Madison WI 53703

a.k.a. *Xerox Sutra Editions*. Word art, tapes, concrete poetry, etc. published by Liz Was and Miekal And. The 3rd Annual Intergalactic Festival of the Swamps took place in Madison this year under their direction, August 26-28. Three days of avant-garde fun: artists of all persuasions are invited to attend/perform/exhibit. Call (608) 258-1305 for more information for next year.

Luna Bisonte Prods
137 Leland Ave.
Columbus OH 43214

John M. Bennett's press, offering cassettes, chapbooks, T-shirts, sticker fun, as well as *Lost and Found Times* (reviewed in the July/August, 1988 issue of *Ohio Writer*). Write for catalog now!

Artcrimes
P.O. Box 14457
Cleveland OH 44114

A loose association of Cleveland artists and writers puts out this always interesting visual/verbal compilation.

Taproot
c/o Burning Press
P.O. Box 18817
Cleveland Hts. OH 44118

The best of the non-academic Cleveland poetry scene is printed in *Taproot*. Individual writers' chapbooks also available from Burning Press. Try the recently begun *Taproot* audio-cassette series, as well (reviewed in the first issue of *Ohio Writer*).

Phobia Magazine
VortexT Publications
2132 Second Ave #305
Seattle WA 98121

Mark Twisted and Beth Prindle, a couple of strong poets who put out *Phobia*, have moved from Kent to Seattle, but plan to continue publishing. *Phobia* is a good place to get to know the younger Kent writers, whom *OP Magazine* once described as "fueled by weak coffee and cheap beer." Intense and graphically striking.

(continued on page 12)

Micropress (continued from page 11)

An Encyclopedia About Us
c/o Linda Day
1725 E. 115 St.
Cleveland OH 44106

Linda Day asked writers to contribute a short article on something they saw, heard, felt, remembered (and no poetry, please!). A roll call of micropress writers answered. Fascinating. Linda's talking about doing another project soon.

Nancy's Magazine
c/o Nancy Kangas &
Gregg Bonnell-Kangas
P.O. Box 02108
Columbus OH 43202

I haven't seen it, which is a great omission on my part. Everyone else I know is enthusiastic about it. They also publish a music fanzine called *The Dave.*

Sean Hill
2730 Monroe-Concord Rd.
Troy OH 45373

His novel, *The Dharma Scum,* written in collaboration with Randy Russell, won high praise from alternative music/writing magazines. He's published *Time Worm* and *Counter Culture,* as well as a number of chapbooks, including one about a trip to James Dean's birthplace. Former member of Kent's legendary band, The Crummy Fags. Ask about current projects.

Randy Russell
P.O. Box 5060
Kent OH 44240

Randy's put out *American Job, The Sweet Ride,* a number of chapbooks, and a novel called *Universe City,* as well as contributing to everybody else's magazines, and playing in the Ragged Bags and Burning Spatulas. Sample Russell sentences: "I had to stop eating in the bedroom. I had to stop sleeping in the kitchen." He's probably moving somewhere but doesn't know where yet. Try the P.O. Box or ask Sean Hill where he is.

White-Wall of Sound
968B Snowfall Spur
Akron OH 44313

A (roughly) yearly magazine featuring the Kent/Cleveland group of writers, and Commander Ray's marvelous photographs. Also available: an unrivaled cassette series of Kent underground bands, including two cassettes of music by the late Dag Nabbit (Keith Busch). Write for catalog.

Anita Smith/Mindy Fries
Helium Ravings
239 East College Ave.
Kent OH 44240

Helium Ravings is a graphic knockout featuring Kent/Cleveland micropress writers. Smith and Fries are members of the performance group Mad B Circus. Look for future projects.

Charlotte Pressler

OW

OHIO WRITER
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Cleveland Ohio 44107

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Cleveland, Ohio

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  PRESS              11
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Ripley, OH 45167
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3

Turn Left at Oblivion

being an extended apazine
with fanfic (gasp!)

Apa by
Guy Consolmagno
200 High St.
Easton, PA 18042

fanfic by
Irwin T. Lapeer
no known address

What I did during my winter vacation... It was a great vacation, frankly, and I managed to do a heck of a lot. Classes let out in early December and exams kept me busy until the 20th or so, so as usual I got absolutely no Christmas shopping done before then. But that's all right; the fact is, my few remaining friends know better than to expect cards on time from me.

One Christmas present story helped me to recognize yet again the difference between the married and single life. My friend Dan Davis (the co-author of *Turn Left at Orion*, about which more later) called me in mid-month to describe a great idea he had for a present for his wife, Léo...it seems that even though both of them have lived in New York City or environs for most of their lives, and they'd known each other (and dated) since high school, and they both loved musicals, they'd never gone to a Broadway show together . He figured that taking her to dinner and a show would make for a different sort of gift. Irony of ironies, Dan had to ask me what shows were actually playing and what ones they'd be likely to want to see. Typical natives, have to ask a tourist for directions...

Well, I had heard wonderful things about the latest Sondheim show, *Into the Woods*, so I gave that my highest recommendation.

But afterwards, it got me to thinking...*I* wanted to see that show, too! And whereas, with two kids, it was hard for them to find the time to get away, for me in my single life it was hard to come up with the motivation to go by myself. (Smacks too much of self-indulgence; and going with someone else would be a lot more fun.) I will confess to a small twinge of self-pity.

Christmas time is certainly the hardest time of the year for single folks. It's not for the reason most people think, entirely...in fact, one of the hardest things is to explain that we really are single by choice, and that being alone is much less awkward than intruding on someone else's family occasion.

Also, I really hate travelling long distances during the holidays. I don't want my enjoyment to depend on the weather. That pretty much rules out going to visit my parents in Florida (besides which, much as I love my parents, I hate Florida.) But mostly, I think Christmas should be a time to celebrate the best aspects of the life you've chosen to live.

Anyway, I compromised my principles on this subject this year, with what I think was good cause. Two Peace Corps friends of mine

---

Dog of Steel

by Irwin T. Lapeer

Mud. Mud. Mud.

It was a river of mud, running down the mountain side and under fir trees and around the lumps of gray New Hampshire granite and right through her tent.

And it was still raining out, a steady summer drizzle that had started in the middle of the night while she was asleep and had turned the woods into a soggy mess. She had been awakened by a funny cold trickling feeling down the back of her neck. When she rolled over, half asleep, into a river of mud she became wide awake.

That nice little hollow where she'd pitched her tent? Now she knew why it was hollow.

Tent, knapsack, clothes, sleeping bag...she carted the whole muddy mess down the mountainside to a chattering brook, noisy and brown and swollen with power. Then she sat down herself, in the middle of the brook,and started stripping off the mud.

Mud!

There was a wolf watching her.

She looked up, through her tangled wet mud brown hair, and she saw him standing on the bank of the brook, opposite her, tongue hanging, panting, watching her carefully.

"Hi. Rover," she said. "How are you doing?"

Rover gave a sharp bark, somewhere between a wolf's and a German Shepherd's.

"Mud doesn't bother you, I guess. Or the rain. Lucky fellah. Can you get across the stream?" The wolf turned and trotted into the woods.

A few minutes later he appeared on her side of the brook. By this time, she was on the bank, a damp, naked figure trying to wring the mud out of her underwear.

"Good going, Fido," she said. Fido/Rover panted appreciatively. "Oh, the heck with this mess," she muttered, half to the animal and half to herself. "Half of the food here is homogenized gunk, and..." She held up what used to be a blouse and made a face at it. She looked up at the sky, gray slate through just got married in October and moved into their new home, and they asked me to help them celebrate. So two days before Christmas, I drove out to Pittsburgh. It was a lot of fun, shopping downtown (they live just across the river from the downtown area, in South Side) and meeting all their family and friends. There were enough strangers (and strange people) that I could easily get myself lost in the crowd.

One funny aspect to it all was going to midnight Mass with Renee. Paul's the Catholic in the family; she's Jewish. But he's a pharmacist in a hospital and had to work that night, so she volunteered to go with me. All of his family were in the church, of course, and some of the more distant relatives who hadn't met me were looking at the two of us with some puzzlement...

Anyway, immediately after Christmas I came back here and prepared two abstracts for the Lunar and Planetary Science conference...the papers had to be in by the middle of January, even though the meeting's not till March. The one break I had during that time was going out to Scotch Plains for a much-needed afternoon talking science and politics and the politics of science with Greg.

* * *

the colorless trees, and grimaced at the warm misty rain that fell on her face. "Maybe I'd better call it quits."

She threw the shirt down on the heap and called the wolf. "Come on, boy. Time to charge you up and call in the rescue squad. Golly," she muttered to herself. "I hope the road's not washed out."

Turning from the brook, she and the wolf headed up the hill.

It was raining harder at the top of the hill, and even under the tree where she'd chosen to string her antenna she would get spattered occasionally with an oversized drop. The rain was warm, fortunately, and there was little wind; all in all, she was glad she hadn't bothered getting dressed. She spoke into the radio, and the radio squealed back."Hello, Tech Square? Come in. Test, 1-2-3-4. Hello, can you hear me? Uh, over."

"Hello. Peggy, can you read me?" spoke the radio suddenly.

"Hi...hi. Fred, is that you?" she asked.

"That's a Roger," Fred replied. "You are coming in loud and clear at the host. The telemetry from the Turtle 17-x satellite device is also nominal."

"Uh, right, Fred," she said. The Turtle 17-x satellite device, a.k.a. Fido, a.k.a. Rover, barked in agreement.

"So. How's the weather?" asked Fred.

"Lousy," said Peggy. "Look, Fred, can you get someone up here to pick us up? My camp got washed out last night, and with everything so muddy I really don't think that this is such a good time to test out Rover. I haven't seen any animals around here, anyway. I think maybe the rain scared them away. I mean, he's doing fine so far, like he can get through the woods without falling over, but the real test was supposed to be how good he could fool other animals, and I haven't seen so much as a rabbit up here so far. So maybe you ought to just send up a truck..."

"That is a negative," Fred broke in. "That is an inoperative situation, insofar as..."

"Oh, cut it out, Fred."

"Sorry. I'd drive up there myself, but the road's been cut off. There's been washouts reported all over the place, and Hansen's Creek managed to wipe out the bridge for Route 110. The state cops say it'll be, like, two days before they can get in there. Can you hold out that long?"

"Yeah, if I don't eat anything."

"What about roots and berries and that sort of thing?"

"I'm serious. Fred. This could be a real problem. Maybe there's enough stuff for two days, but most of my food got turned into mush."

"I'm serious, too. There's no way we can get anything to you right now, short of a helicopter. If you are really desperate, you can probably walk out. The nearest town is, what, only about twenty or thirty miles away. Of course, that's out of the range of the 17-x's radio. And that would mean abandoning the front end interface..."

"Rats," said Peggy. To hell with the front end interface, she thought to herself, except that she'd never hear the end of it from Fred when she got back...

"Well," said Fred, "it's up to you. Don't let yourself be tied down just because there's half a million newbuck's worth of electronic equipment there that you're supposed to be babysitting. Seriously, I mean that. I mean, nothing serious is likely to happen to it if you leave it there for a few days. Nobody is likely to wander through there and surprise you."

A good thing, thought Peggy to herself. Somehow, she felt more naked when she was talking over the radio to Fred.

"Hmm," she said. "I wonder where those rabbits are. Is Rover programmed to hunt?"

###

It was cool, and comfortable, and dry, and almost sterile, in the soft gray-panelled air conditioned room on the fifth floor at Tech Square. A row of terminals glowed softly against one wall, and a table, littered with a few papers, stood along the wall opposite them. As they entered the room, the two older gentlemen and their guide passed a white marker board littered with memoes from an earlier meeting. They ignored the memo board, and faced, instead, the amalgam of wires and screens which cluttered the far wall of the room.

The whole mess, which had the unmistakable appearance of having been wired in a hurry, was manned by a young fellow with very long black hair and a scruffy growth for a beard. Without looking up from his screen, he waved at the others as they walked in. He appeared to be talking into a telephone.

"Roger," he said. "I'll get back to you. Over and out." He set down the phone

That took the better part of a week. Immediately after that, I was off to the Jesuit Noviciate house for a week-long retreat. It was pretty intense...it was pretty good. I belong there, I think.

After that, I drove off to Long Island to visit with Dan and Léo for a few days. When I arrived, they greeted me with two Christmas presents. One, I was told, I couldn't share. It turned out to be a pound bag of M&M's. (They know me well!) The other was a big box, which I was told, I had darn well better share. I opened the box. Inside was mounds of crumpled newspapers. Under the papers, I finally found a plastic knife and fork. Under them...three tickets for *Into the Woods*!

The rats had me fooled completely. Dan's clever questioning in December was really to find out what show I would like to see, so they could take me!

Before we could go to the show, however, I had some more travelling in front of me. From Dan and Léo's place, it's a relatively easy drive to JFK; and after a day visiting them, I was winging my way to England. I spent four days hiking in the Lake District (my candidate for paradise on Earth) before travelling to Cambridge for another session

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and turned to the others. "Hi, Allan. It's going great. The input from—oh. Hello."

"Fred," said Allan, "this is Dr. Solomon from the visiting committee—" he indicated a short, thin, wiry-haired older man dressed in a somewhat shabby suit, "—and Dean Warden, from the Office for Sponsored Research." The other man, also grey-haired but showing signs of fighting a losing battle against his weight, raised a hand in self-depreciation.

"No, no," said the Dean, "don't bother us. I mean, don't let us bother you. We're just here as visitors, not to waste your money, I mean your time, to just have a look around." He smiled an overlarge, toothy grin that somehow did not fit comfortably on his face.

"Hi," said Fred.

Solomon spoke more slowly, deliberating on each word. "We're quite interested in what you're doing here. We understand you have some sort of artificial intelligence project underway."

"Yeah," said Fred. "It's our most complicated turtle, and also the most remote satellite we've tried so far."

"How's Peggy doing?" asked Allan.

"Great. Clear signal, the readings on all the telemetry are all absolutely nominal. Just superb."

Solomon whispered to the Dean, "How can something be *absolutely* nominal?" The Dean replied with the smirk he used when he suspected something cutting or witty had been said.

"What about the weather? Are they surviving the rainstorm?"

"No problem at all. The turtle can be completely immersed in water and still function nominally. It's quite fine...oh, and Peggy said something about her tent getting wet."

"That's to be expected, I presume." said the Dean, with a broad grin.

"I don't understand," said Dr. Solomon. "What are you doing here?"

Allan spoke up. "We've got one of our satellite units up in New Hampshire right now, operating on a link with the computers here in Cambridge," he said. "The unit has local processors so it can do things like walk through the woods without tripping over something, but all the decision-making is done on the 11/224 upstairs."

"I see. And it's supposed to simulate an animal? You called it a turtle, I believe."

"Actually, it's a wolf," said Fred. "We just call all of our satellites turtles, because the first ones were little round plexiglass domes on wheels."

"And turtles have wheels," commented Solomon drily.

"Actually, no," said Fred. "At least, I don't think so. Anyway, this one really isn't a wolf; I mean, obviously it's a machine, right? But, I mean, we tried to make it look like a wolf, because it's, like, going up in the woods, right? Actually, nobody around here has ever seen a wolf, so we sort of made it up as we went along."

"And you call it Peggy?"

"Huh? No, that's my girlfriend. Well, I mean, she's sort of my girlfriend. Well, anyway, she's a girl I know. She's studying zoology, and when we needed someone to go up and keep an eye on the thing she volunteered. Actually, she doesn't know much about the project, but that's so she won't bias the results. It's what you call, uh, a double-blind experiment?"

"No," said Dr. Solomon. "It isn't."

###

"Come here, Fido. What's wrong with your left paw?" Fido walked over to where Peggy was sitting on the ground, next to the radio receiver, and lifted a paw. She reached under his chin, as if to scratch, and placed a finger on a hidden spot. He froze.

Peeling back the fur from his paw, she gave careful scrutiny to the metal and wires underneath. It was obvious that this dumb machine had caught his foot someplace in the woods and bent a piece of the metal skeleton slightly, but that wouldn't explain...ah, here it was. She fished in the toolkit near the repeater radio and found a pair of tweezers, then moved them carefully in among the sensor pads until she reached a thorn that had worried its way into the electrical contacts.

"Ha!" she told Fido, as she replaced the fur and turned him back on. "You are in my debt forever! Remember that someday, when I'm about to be eaten alive..."

She sighed. "Oh. puppy, sometimes it's hard to believe you're just a machine." She gave the gray lump a hug.

Overhead, she heard sound, off in the distance. It was an odd sort of thwapping sound. After a moment, she recognized it as a helicopter.

"Speaking of machines," she muttered to herself. Hm...maybe she really shouldn't be running around here, starkers. Granted, she hadn't seen anyone in this part of the woods for the three days she'd been camping, but even so, this wasn't a totally isolated place. And maybe with the rain, people might be seeking higher ground.

She looked around her, a little apprehensively. Still, nobody here. But maybe she'd better get back to her camp stuff down by the stream anyway.

She headed down the path to the brook. Of course people came through here, she reminded herself angrily. Where did she think this path came from? She stopped every few feet, expecting to hear the clomping footsteps of fat tourists in loud shirts, or the squeal of bratty kids.

She got almost down to the stream without incident. It was rather foolish, she decided, this panicking. Nobody had been here in weeks. Why should anyone arrive now, in the rain?

"Look!"

Peggy stopped short.

"Look!" said the voice again, a piping, small-female squeal. "Somebody's been camping here!"

Peggy jumped into the underbrush, gathering painful scratches, and peered through wet leaves. There, across the stream, a woman and two children were heading up towards her campsite.

"Cheryl Ann!" cried the woman. "Shout if you can hear me." There was a touch of panic in her voice.

"She's still in the river, Ms. Barr," said one of the children. "C'mon, this way."

"I think we should stay in this camp until the campers return," said the Ms. Barr one.

Not this camper, thought Peggy. Not on your life.

###

"It's amazing," said Dean Warden. "And you say it is all hooked up by satellite? Do you recall offhand how much NASA support we're getting for this project?"

"Huh?" said Fred.

"Oh," said Allan. "No, I think you misunderstood. Satellite is just a term we use to describe a part of the computer that is, uh, separated from the main computer. It has nothing to do with the space program."

"I see," said the Dean, somewhat crestfallen. "Of course. Satellite. Ha-ha." He giggled, as if he had made a little joke.

with *Turn Left at Orion*'s publisher, Cambridge University Press. It was both satisfying and unsatisfying. They have finally figured out how to reproduce our illustrations (which we carefully and with great difficulty had produced according to their own original instructions). On the other hand, they want to use our 300 dot per inch Laserprinter print-out as if it were camera ready copy. Sorry, it's good quality but I can't believe it's that good. Anyway, the book should be printed sometime this summer, and ready for Christmas 1989. That's only two years after we delivered the manuscript to them. Sigh.

Had time (and money) for just one day in London, then it was back to New York. The three of us went into the city on Saturday for our play and dinner, and it was great. Of course, I'm a big Sondheim fan anyway, but seeing a production by professionals on a New York stage in a reasonably small theatre was just great. The only other musicals I had seen were either from cheap seats in London, more than 10 years ago, or from the stratosphere of the balcony at the Wang Center in Boston (one of the all-time lousiest theatres, in my opinion. All seats are bad, regardless of price! And the acoustics are matched only by MIT's Kresge Auditorium...but that's another story.)

So last weekend I arrived back here at Lafayette, just in time for the start of classes last Monday. I have a pretty easy schedule this term, only two courses and 1 1/2 labs, and for a change no night classes. I'm looking forward to feeling human this term.

So what's with the fanfic already? Irwin T. Lapeer, the infamous, has a friend with a scanner who converted his ugly manuscript into computer-readable form, so I've ported it into the zine. Tell me honestly, could it sell? Anyone who wants to be an agent, I have a trunk full of this crap to foist off on the unsuspecting public...

Mailing Comments.

The Cover has earned a place on my office door. gjr has done it again!

Crumbcrunchers Between your stories and watching Dan and Léo's kids (aged 3 and 5) I have an enormous respect for both parents and preschoolers. After 20 years, how many (hypothetical) computers can master the skills you've outlined? But to me, the most impressive is how a bratty 2 year old can grow into a (relatively) patient 5 year old, with nothing more than two very patient parents calmly saying "no". It's wonderful. Can the same techniques work on politicians?

"But then," asked Dr. Solomon, waving his hand around him, "what exactly is the purpose of all this?"

"This is the control room," Fred started.

"Yes, I see that. But why? Why are you bothering to do all this? What is the point of your experiment?"

"Ah. yes, I have found it," said Dean Warden, paging through his notebook. He stopped, and looked up. "Here it is."

"It's just, like, it seems like an incredibly cool thing to do," said Fred. "You know, to make a machine that can act like an animal, and fool all the other animals."

"You people received N$240,000 last year from the Space Agency. I thought so." said the Dean, quoting from his notebook.

"It's basically an experiment in artificial intelligence," said Allan. "The idea is to see if we can simulate in the lab the actions and decision-making process of a moderately complex but sub-rational animal, in real time. It's a test of our equipment and also of our theories of how decision-making occurs."

"Yes," said the dean. "In addition to the NASA grant, there's nearly N$4 million over the past five years from NSF, a grant entitled 'Decision Making Processes and Simulations...'"

"Thank you. I understand that," said Dr. Solomon. "Was there any particular reason why you chose a wolf? I mean, they're extinct now, aren't they?"

"Ah," said the dean, "then that would explain the N$200,000 from the Neozoic Foundation."

Allan smiled. "If you look, you'll also see some funding from a company called Urban Technology, which is thinking of marketing a line of mechanical pets to people who live in places like Beacon Hill, where animals have been outlawed for sanitary reasons."

Dean Warden smiled and nodded. "This is a somewhat expensive project."

"Yes," said Dr. Solomon. "I'm aware of that."

# # #

Peggy had just one idea—get the heck out of there. The last thing she needed was to explain herself to some outsiders. The project probably wouldn't like the publicity, either. But the less exposure she had, the better.

She started to head back up the path; but high ground would be visible ground, and most of the paths led to the same place as the path she was on. She made a quick left turn, and headed away from the camp.

It was scratchy going—she couldn't believe just how scratchy—and slow. Every step required careful scrutiny...she wished for a good set of hiking boots, the set she had back at the campsite. She tried to step through the shrubbery quietly, and finally came to a muddy clearing. One step into it, she found herself sliding helter-skelter down the slick mud slope towards the river.

Fido didn't have any problems at all. He'd roamed on ahead, happily plunging through the brush and rocks, scouting out the territory and then returning to her. When she reached the river, he was already there, trotting downstream aways; then he stopped. He gave two short barks.

"Hi, it's a dog!" she heard. "Go get help, dog! Go get help!" Out in the river, she could see a small figure pinned between two logs.

It was a little girl.

Rats. The hell with modesty, kid, Peggy told herself—that kid's in trouble.

"Hi, Dog! Nice dog. Go get help!"

The dog barked again.

"Hold on!" shouted Peggy.

"I am!"

Without thinking, Peggy leaped into the swirling river and found herself tumbling down the river towards the little girl. In a moment, she was swept into the tree with the little girl. She grabbed on to the log that was pinning the child down. "Hold on to the tree!"

"Huh?"

"I'm going to move this log off you."

The book *Chaos* is both fascinating and frustrating. The subject matter is phenomenal, and the writing is clear and exciting. But the frustration comes from the fact that he never really gets around to telling you the nuts and bolts of how to do it yourself.

If you have a spreadsheet program that does plotting (such as Excel on the Mac) then you can demonstrate chaos for yourself. Define two columns. Column one, cell one, (A1) is any number between 0 and 1. To its right, B1, is the value =A1*μ*(1-A1) where you define μ someplace else as a variable between 1 and 4. Then move this value to position A2, and fill down both columns for about 50 places. Then plot the values of column A. With Excel's windows, you can see the spreadsheet and the graph at the same time, so you can see what happens when, for μ=4, you make tiny changes in the value of A1. The graph looks completely different!

I've been trying to learn enough of the theory of chaos to apply it to some of my research. I'm pretty sure the positions of the dust particles in orbit around Jupiter are chaotic. My questions are, first, how do I prove it, and secondly, so what? What does the fact that they're chaotic tell me that I didn't know already?

Greg and I had a good long talk trying to understand the difference between chaos and randomness. If I have an ensemble of particles that behave chaotically, can I always, or ever, say that the ensemble behaves randomly? I suspect that I can't say "always", but I'm not sure about "ever". The trouble is, various people have defined chaotic systems in different ways.

One book, *Order within Chaos* by Bergé, Pomeau, and Vidal says that any system whose fourier spectrum is a continuum is chaotic. Since the Kolmagorov spectrum fits this, and that's the fourier spectrum of a random process, then an ensemble of chaotic processes is equivalent to a random process. I think. Anybody out there help me?

I really like a lot of Madeleine L'Engle's books, but strangely enough *A Wrinkle in Time* never did anything for me. I wonder why? I too love the Susan Cooper books. And my love of the Lake District was started when I read the Arthur Ransome books (which aren't SF, in case you fans out there are wondering why you never heard of them.)

Interesting Times Here's a question you may already be sick of...but in your travels back and forth, especially living for a length of

The little girl grabbed at the tree, one arm at a time, while the Peggy wedged herself between the tree and the log and gave a heave. The log moved a bit, but not enough. "I think it's caught. Can you put some weight on that branch?"

"I'm weighing as much as I can already."

"Oh. Uh, we've got to get that branch down to—NO, FIDO! YOU IDIOT!"

"Gosh, I didn't know dogs could climb on trees!"

"He's a wolf, not a dog, and he can't, either. You dumb—over here. Over to the right, if you're going to do some good. Yeah. Yeah!"

Fido had bounced down on a branch and freed the log; now, panting like any animal that was constantly exerting itself just to keep balance on the branches, he stepped over to where the girl was still holding on.

"He's going to bite me!"

"I've got her, Rover. You just get back on shore before you fall over and drown yourself! If you fall in the river, I don't even know if you can float...can you?"

"Course I can," said the girl.

"Not you. I was talking to the dog," said Peggy.

"Wolf," corrected the girl.

"Right."

Peggy swam over to the girl and threw an arm around her. "Ok, let's get back to shore."

"Can he understand you?" asked the little girl.

"As much as anyone can."

Slowly they worked their way back through the tangled branches towards the shore. By the time she pulled the little girl up onto the river bank, both of them were shaking from cold and fright and exhaustion.

"Woof!" said Peggy.

"Woof!" agreed the wolf.

"Are you all right?" asked the little girl.

"Boy, that takes it out of you," said Peggy. "Yeah, I'm fine. But how are you? How did you get stuck there? Who are you with?"

"I'm fine. But—" The little girl looked back and forth between the wolf and the naked woman. "Who are you?"

Peggy sighed. "Just call me Nature Girl."

The girl looked over towards Fido, who was watching them and panting. "Is he safe?" she asked.

"I doubt it," said Peggy. "Say, look, uh, is somebody..."

"You live here in the woods?"

"Uh, yeah..."

"By yourself?"

"Uh, yeah, just me and the wolf. But..."

Peggy could see the wheels turning in the little girl's mind. She thinks I am a real nature girl! Uh, oh, thought Peggy, as the little girl's eyes grew wider and wider. That's the last thing I need, word of this adventure getting back to Cambridge.

"Uh, look." said Peggy, getting up and walking back towards the path. "Don't you think we ought to be heading, uh—" She turned back towards the little girl.

The little girl was already half out of her clothes. She followed Peggy's glance. "They were sopping wet anyway," she said. "I want to come with you."

"Uh, no, you don't understand," said Peggy. The little girl had that look, like she knew what was coming. Deliberately, she finished pulling off her pants, and then sat on the pile of soggy clothes, naked, and pouting.

"It's because I'm too little, right? I never get to do anything!"

Good grief, though Peggy to herself. What have I started?

"I'm sick of all those people," the girl continued. "I wanna live in the woods...and no more city, no more stuffy classroom and stuffy teachers. If you won't let me live with you then I'll live by myself. I'm never going back!"

This was going to take some work. Peggy walked over and sat down near the little girl. "Kid," she started. She really ought to find out what her name was. "Kid, it's really not what it's cracked up to be. It's hungry and cold and lonely."

"You've got the wolf."

"Yeah, I've got the wolf." The kid's right, she thought to herself. If it wasn't for the wolf I wouldn't be here. "I've got the wolf, and you don't. That makes all the difference."

The little girl though about that for a few minutes, in silence. And they sat there, looking at each other, beads of river water dripping off hair and face, as the rain came down.

###

Fred had gotten involved again in monitoring his screens, and so at Allan's suggestion the two visitors left the room and continued their conversation

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time in both cultures, what do you find the hardest to adjust to? And are you surprised to find similarities that you didn't expect to see?

When I got back from Kenya, one thing that struck me, to my surprise, was the similarity of the "styles" of poverty in both cultures. Of course, the truly poor in Kenya are far worse off than most Americans, but I was shocked to see how many Americans live like poor Kenyans. I am thinking, for instance, of the sorts of shacks that I see, off the beaten path, in rural Pennsylvania; the style of the hand-painted signs in little country general stores; the way that pick-up trucks, for instance, are decorated with slogans and pictures (Kenyans just don't have as many machine-produced bumper stickers, but the instincts are the same.) In other words, they really aren't so different from us; or rather, the split between the classes (economic or intellectual) is probably greater than the difference between our national cultures.

Oblivion Well, the Jesuit thing is still on track. And I managed a week's silence with no problems. (It's not total silence; you spend an hour or so talking with a spiritual director. You just don't talk to anyone else. It's quite pleasant, actually. Makes you think more.

down the hall.

"I'll be frank with you." said Solomon to Allan. "The thing that has bothered us is that, although this is an expensive project, we're not quite certain that it is a very focused one. I mean, you've got all these grants—" he waved over to Dean Warden's notebook—"and all these different agencies pouring in lots of newbucks, but you're telling each one a different story. For NASA, you say you're developing a machine that can walk on Mars. To the City Canine Corporation, or whoever they are, you've got a mutt that won't poop in the streets. Ok. I recognize that that's the way that funding works. I'm not here to cut you out of any money. That's not my job. If they want to give you newbucks, that's their affair. But I have to look at it from the point of the Institute. Where's the science? What have you accomplished?"

"You have been very broad in your funding..." started the dean.

"That's a very tough question, Dr. Solomon," answered Allan. "Because, really, to me, the value I've gotten out of it, so far, is not quite what I expected. It's certainly not the sort of thing we write into the grant proposals." He looked up at Solomon; Solomon smiled, encouragingly.

Allan continued. "The biggest thing, to me, is getting a real, gut-level appreciation of what it's like to be an animal, in the wild. When you're monitoring that machine, or even when you're planning how to program his responses to various stimuli, you really put yourself in his shoes..."

"Paws," suggested Dean Warden.

"In other words, you really learn just how well you understand something when you try to program a computer to simulate it," suggested Solomon.

"It's more than that," said Allan. "Look, let's go back to the monitors. You can see for yourself what it's like to be sitting inside a wolf's brain."

They walked back into the room where the control board was located. Fred had left the mess of wires, though, and was shouting into the telephone. "Hello? New Hampshire State Police?"

###

Well, though Peggy to herself, I guess I felt like that once. There was some sort of childish, adolescent mystique about running naked in the woods. But, of course, she had outgrown that herself a long time ago. Half an hour ago, at least. When she started getting cold.

She looked over at the naked little girl, really a rather plump and funny-looking kid...muddy yellow hair, and rain running down her face. Was she crying? It was hard to tell. She was looking down, trailing a finger in the mud.

The girl got up with a sudden motion and walked along the river bank to where some white-flowering weeds were growing. She leaned into them and started pulling up a bunch. She wandered up the bank a few steps, and then into the woods, stooping and gathering things. Peggy just kept watching her, wondering what she was up to. Soon she returned, a chubby little girl with an armload of green and mud, which she carried down to the river and started washing.

"Hello?" called Peggy.

"Want some?" asked the little girl. "I was hungry." Peggy began to recognize some of the forms as runty carrots. Other leafy things were still a mystery.

Roots and berries, she said to herself, laughing.

"That's pretty good." said Peggy. "Thanks. I'm hungry, too. Where did you learn that?"

"My Uncle Bill showed me these on his farm," said the girl. " Of course, you must know all the good stuff to eat, living here. He's got a dog, too, my Uncle Bill does. But not a wolf. I wish I could have a dog."

"You live in the city?"

"Yeah. It's against the law now, dogs and cats and stuff. Pets. They're noisy and dirty and spread disease. We didn't have one before they passed the law, so we can't have one now. Did you always live here, or is that why you decided to leave the city?"

"Sort of, yes," said Peggy. "I study animals."

"Not many animals left out here, either."

"I know," said Peggy.

"It's because of the people. Wherever people go, the animals run away. But that's not so, because here you are with a wolf."

Yeah, thought Peggy. A wolf. Except for the spots where they couldn't find out what a wolf looked like and so they used a German shepherd, instead.

"And aren't people animals, too?" continued the little girl. "Human beings, I mean. We're animals. Why couldn't we all just live in the woods? Look at the wolf—he can do it. You do it. Why can't everybody?"

"Maybe it's because we're more than animals," said Peggy. "You need cities to have cars and TV's, and I don't know, all sorts of things that animals have no use for."

"We don't need those. You've got your wolf—you don't need any machines."

"Uh, actually..." started Peggy. She munched on another wild carrot, and tried to think. How could she say this?

"Of course, you can't have wolves in the city," reasoned the little girl. "Maybe that's why people have machines."

"Cities have knowledge and culture, too," said Peggy. "Universities. I'll be going back."

"Back where?"

"To the city," said Peggy. She stood

And, as everyone else pointed out, the book I was thinking of was *Citizen of the Galaxy*. As it happens, my Pittsburgh friends had a copy of it so I re-read it again over Christmas.

Relevant to nothing, I also came across in a library recently a book put out by Kahn and his futurists back in the 1960's which purported to predict what the rest of the 20th century had in store for us. It came out in 1967, when there was still a third of the century to go; since we have only 11 years left, I thought it would be funny to see just how wrong they could get.

Well, admitting that they were being very conservative, these guys suggested that by the year 2000: Japan would be one of the three dominant economies in the world...that the relative powers of the US and Soviet Union would decline and that the new rivalries would be between "North and South" have versus have-not nations...that Europe would get its economic act together out of sheer competitive necessity...that one big destabilizing force in underdeveloped nations would be a rise in religious fanaticism...

Hmmm...

up, and brushed the dirt from her backside.

"Right now?" asked the little girl.

"Well, eventually," said Peggy. "Come on. There must be people looking for you upriver someplace." In fact, thought Peggy, I'll bet I know just where they are. She remembered the group of people she'd met on her way to the camp.

The little girl gave her a funny, disappointed sort of look. "So, look," said Peggy. "Why don't you wring out your clothes and put them back on and, uh, we'll go look for your parents."

"You mean Ms. Barr."

"Whoever."

"You don't want to meet her," said the girl, with the voice of experience. "I don't think she would approve."

"You're probably right," said Peggy.

"They're just up the river. Have another carrot." She sat and munched in silence.

Peggy squatted down and looked over at her. The girl was still sitting in the mud, chewing her carrot. "Who's Ms. Barr?"

"She's my teacher."

"Oh."

"You see," continued the little girl, without looking up, "we were on a field trip, from the Middleton School, and the van broke down, and then the river washed the road out? Well, part of it. You could still walk along the road, but half of it fell into the river so you couldn't drive or anything.

"And about this time, this guy showed up walking from the other side of where the road fell off, and he said he needed our van. And when Ms. Barr wouldn't let him take it, he...he pulled out this gun—" At this, little girl stopped, and turned to Peggy, focussing her intense, deep blue eyes on her.

"It was a *real* gun.And he said he was a *Bank Robber.*" The girl paused, and stared back down at the ground again.

Do I believe this? Peggy asked herself. She looked at the naked kid, at the metal wolf, at herself; but for that matter, she asked, do I believe any of this is happening?

"And Ms Barr didn't scream or act scared or anything, but she just stood there like a stupid old cow and let him kick all of us off the van into the rain and made us stand out there while he tried to drive the van off the way he came. Anyway, I'll bet he must have been pretty mad when he got the the bridge and found out that it was washed out, too."

"But how did you wind up in the river?"

"Well, I was gonna leap out of the van and attack the bank robber, but then he...well, actually, we were all, all of us kids, standing behind the van after he kicked us out and we were by the edge of the road, and Melissa pushed me, and...well, actually she pushed Monica, but I didn't like her anyway, and...well...I guess...I stepped back without looking. And I slid down the mud and into the river."

She looked up at Peggy. "Pretty stupid, huh?"

"Well, you managed to keep yourself swimming once you were in the river."

"Yeah, that was fun!" said the girl. "But, actually, I guess I was pretty scared till you found me. Want another carrot?"

"Thanks," said Peggy. "Don't you think they're looking for you?"

"I doubt it," said the little girl. "This is neat, sitting in the rain like this. I wonder why people don't do this more often?" Together, they sat in silence, feeling the patter of the warm raindrops on their skin, smelling the mud, listening to the river and the breeze in the treetops.

###

"What's up?" asked Allan to Fred. "Why are you calling the police?"

"There was a big bank robbery in Concord," said Fred.

"So?"

"Concord, New Hampshire."

"So?"

"A guy shot his way out of the bank, hurt three people, took off with a hundred thousand newbucks."

"So?"

"He headed north, and when the cops tried to cut him off, he took off into the woods near Middleton."

"Oh," said Allen. "That's where the satellite is. Well, he's hardly likely to stumble on it. That's a lot of mountainside up there."

"Yeah," said Fred. "Well, it turns out that the cops are combing that whole mountainside. All those people tramping around, they'll probably screw up the entire experiment, don'tcha think?"

###

"Just before I got here," said Peggy, "I heard some people over the crest there, sounded like they were looking for someone."

"A goofy lady and a bunch of kids?" asked the little girl.

"Yeah," said Peggy.

"Oh, well," said the girl. "I guess I better go find them." She got up and looked at her muddy clothes. "Maybe they'll be dry by the time I get there."

"Just follow the river; up around the next bend is a path up the hillside. They were up there, last I heard them."

"Ok. And, thanks for everything."

"My pleasure," said Peggy. "It does get lonely here, even with the wolf. I guess...well, normally I guess I'm pretty shy around people, but you've been good company."

"Maybe someday I can come back and live here with you?"

"Maybe," said Peggy. Hey, who knows? she thought. Nothing's more precious than a dream.

"And be a Nature Girl like you?"

"Consider it done," said Peggy. "I'll

Death of a Fresh Water Lake Greg mentioned to me a bunch of things he'd read concerning various hushed-up ecological disasters. I hope he prints a bibliography here; these things are scary, but need to be known so that (with luck) we'll learn from them.

To various folks who have mentioned precocious reading; I was not such (sigh) but a friend of mine, Rick Greenberg, who's a celestial mechanician at U of Arizona, has two kids (maybe more by now?) who were pre-schoolers, aged 3 and 4, when I met them in 1980. The younger was carrying around a copy of one of the Narnia books. I asked her mom if they were having it read to them. No, I was informed, they could read it themselves. (I didn't read the Narnia books till I was in college.) Poor kids!

Maybe there are certain behaviors that a society should officially not condone, because they are destructive to society; but which still should not be made illegal, since they do not directly hurt any individual. Maybe we should pass something different from a "law" that defines what these activities are, and say that it's perfectly permissible for any private group that wants to, to discriminate against people who violate put you in charge of nuts and berries. Especially nuts."

"Like us!" laughed the little girl.

"Say, look," said Peggy. "I'll walk up with you as far as the river bend, but I really don't want to meet anyone; so..." She stopped suddenly. They both froze, and listened. Down by the river, they could hear a crunching sound of someone breaking through the brush.

"You better go," said the little girl.

With a nod, Peggy and the wolf faded into the underbrush up hill from the river. Leaving her soggy clothes in a pile, the little girl ran down to the river, calling, "Ms. Barr! Ms. Barr!" Peggy looked back through the leaves—just in time to see the girl grabbed by a large man, in a very muddy suit, carrying a large metal gun.

Peggy froze.

"Up...upstream," she could hear the little girl say. *Don't look up here,* thought Peggy. The man muttered something. "No, I was just swimming," said the girl, loud enough so Peggy could hear. "They're all up the river." The two of them proceeded upstream, towards the path to Peggy's camp. In the underbrush, cursing her scratches, Peggy followed.

###

"Turns out," said Fred, "one of the guys shot in the bank hold-up was the husband of the bank president. She's put out a 50-K reward. That's a lotta newbucks; we could get a new transmitter for that!"

"Perhaps," suggested the Dean, "you could design a mechanical bloodhound to track bank robbers? We might get a grant for that, from..."

"Naw," said Fred. "The way you solve these things is by putting yourselves in the shoes of the robber and thinking like he thinks, like they do in Sherlock Holmes."

"Reminds me of a certain conversation we were just having," remarked Dr. Solomon.

"Never mind that now, Fred," said Allan. "Let's get back to business. Are you monitoring the wolf now? I wanted to give Dr. Solomon, and the Dean, a chance to see what that's like."

"Well, yeah, sure," said Fred. "Pull up a chair. Now, you see, these monitors show..."

###

When she got to her old campsite, Peggy could see a handful of children standing around an obviously perplexed teacher. Must be Ms. Barr, she figured. Suddenly the group was roused by the sound of people tramping up through the underbrush from the river.

"Cheryl Ann!" cried Ms. Barr. "We found you!"

The man with the gun appeared, holding tight to the bare arm of Peggy's little friend. At the sight of the naked girl, the teacher let out a gasp. The other girls started to giggle.

"You swine!" cried Ms. Barr. "If you've touched that child—"

"Look, lady," said the bank robber. "You stay right there and don't do nothin'. Now here's what's gonna happen. We're gonna—"

"It's the police!" cried one of the children. Overhead, through the trees, they could hear a helicopter hovering; and then, suddenly, they could see it. On its underside it was clearly marked Police.

It disappeared as quickly as it came, but they could still hear it nearby.

They could see the robber thinking furiously. The campsite where they were all standing was in a clearing, and it was a matter of minutes before the police spotted them. "Look, lady," said the robber again. "You just stand there and don't wave or do nothin', or else the kid gets it, got it?"

She got it.

Slowly , with the little girl in tow, he walked across the clearing and up into the woods. Overhead they could hear the beating of the helicopter blades slowly drifting away.

Under cover of the trees now, the little girl squirmed. The robber gave her a dirty look and twisted her arm. "I ain't out of the woods yet. You just—"

A savage, wolf-like snarl cut him short.

"What the—!" exclaimed the robber.

Bounding through the trees was a gray blur.

"Hell!" exclaimed the bank robber.

He shoved the child to one side and drew out his pistol.

BLAM!

The wolf was staggered by the impact of the slug, full in his chest; but it kept running toward them.

BLAM!

The second shot knocked the animal off his feet; but he bounded up again, a gray splotch on his chest showing where the slug had hit.

BLAM!

The third shot was a point-blank

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these rules. Examples of such behaviors? Ah, here's where we could be controversial. How about...dodging the draft; selling (or even smoking?) cigarettes; using "soft drugs" (like marijuana); maybe even selling or using any sort of drugs—by decriminalizing it we could take away the profits. What about making or selling various types of pornography? What about abortion? What about prostitution?

Dust... Not a whole lot to say, except I hope you continue to enjoy the miserable life of a student! And it's good to see Bruce is still around.

Keep in touch! Don't leave!

range; but the wolf was in a hurry, and so was the robber. The shot somehow missed.

Through the echoes of the shots, another sound could be heard, the thwapping of the helicopter blades drawing closer.

And the robber screamed as the jaws of the bulletproof wolf wrapped around his wrist.

He kicked at the animal, but the only result was a dull metallic sound. There was a look of shock in the gunman's eyes.

The helicopter was landing. His gun hand was pinned by the wolf, so the robber dropped his weapon. The wolf let go of his wrist then; and with one glance towards the police and another into the woods behind him, it bounded off through the trees.

His only chance was to run, the robber decided. He had a hostage; they wouldn't shoot so long as he kept her. And everyone in creation must be back there at the campsite...the safest place had to be here in the woods. No, better yet, he'd drop off the girl someplace; then while they looked for her he could be heading in the other direction. But he had to get away from the cops. That damned animal, it broke his hand, he couldn't use it...to pick up the gun, he'd have to let go of the girl...it must have been a police dog, it'd stay with the cops until...

A woman stood in the path, directly ahead of him. He looked from the woman, to the little girl, and back to the woman again. Neither was wearing a stitch of clothing...

"It's Nature Girl!" breathed Peggy's friend.

"Don't say a word," said the bank robber, "or I'll break this girl's arm. I mean it."

"It's her woods," whispered the child. "She'll call it up against you."

"What's this?" he asked. "You live here? This some sort of weirdo colony?"

Nature Girl shook her head. "We're alone," she said. There was a sort of catch in her throat, as Peggy's embarrassment mixed with her fear to give her a whispering, other-worldly sound.

"Great," said the robber. "You can put me up for a few days here. You know these woods, I'm sure you can make sure nobody finds me."

Peggy looked at the little girl. Options: scream, run, and let the little kid get a broken arm or worse; or... The child looked back, full of confidence in Nature Girl.

"We could hide you so that no one finds you," said Peggy, still speaking in a low, strained whisper. She saw the little girl's ears perk up at the "we". "In fact, no one may ever find you."

"I warn you, any funny stuff and the kid gets it."

"You wouldn't want to hurt her. Not if you want food or shelter."

"That's right," said the little girl, picking up her cue. "I know the plants that are good to eat." She paused dramatically. "And the ones that are poison."

"Try to poison me, and I'll—"

"You'll what?" asked Peggy, trying to keep her voice steady. "Shoot us? But you've seen how much use your gun is against us. It didn't seem to do too well against our four-legged friend. Oh, yes, while Little One takes care of the plant life, I watch after the animals. Would you like to get reacquainted with my pet?" On cue, the wolf stepped out beside her.

It was beginning to dawn on the bank robber...something strange was going on. Naked women in the middle of the woods...wolves that come without a whistle or a call...and that don't get stopped by bullets. There was a look in the wolf's eye, cold and dry, that was like no living creature he'd ever known. It froze his soul.

"Don't worry," said Peggy. "I can stop him here." She scratched under his chin and the wolf immediately stiffened, frozen into an obviously unnatural position.

She slowly walked towards the man and the girl. "It just takes the slightest touch," she said. She reached out towards the little girl's neck, and placed her hand below her chin. Little One froze her face into a grimace.

Standing next to him, smiling almost seductively, Peggy reached her hands up to the bank robber's throat.

He jerked his head back, and dropped the child into a heap on the ground. He turned and ran.

The little girl jumped up when had gone, and ran towards Peggy, throwing her arms around her and shivering.

"You all right?" asked Peggy, soothing the little girl's arm where the robber's grip left an ugly red welt.

"Ouch. Sure, I think so. But what about him?" the child replied.

"He's heading straight back towards the camp. The cops'll get him. We ought to scoot, too."

"Huh?" said the girl.

"One outsider's seen me already," said Peggy. She smiled at the little girl. "I don't count you. But anyway, I've got to move. Clear out of here completely. I can't afford to be seen by anyone. And you've got to go home too...yes, you do. Otherwise all your friends will really rip these woods apart looking for you, and we don't want that."

"Where will you go?" asked the child. Peggy only smiled. The little girl started to pout, but turned instead to stare intently at her. "I'm coming back here, someday. For good."

"Maybe," said Peggy. "But you've got to be going now."

"I guess." She turned and slowly walked back up the path towards the camp. She looked back, suddenly, and looked at the wolf who was still frozen stiff. "Tell me," she said. "Are you really a nature girl?"

"What do you think?" asked Nature Girl.

###

She guessed the radio receiver would be the safest place to stay until the helicopter departed. And there were still some questions that she needed answering. Under the tree at the top of the hill. she sat down and pondered.

"Good puppy." she muttered to herself. "Nice, armor-plated doggy. What the heck gave you the idea to attack that guy with the gun? And who the heck was he, anyway?"

The radio emitted a squeal, and Peggy walked over to tune it in. "Hello, Tech Square? Test, one, two, three, do you read me?"

"Hi, Peggy," came Fred's voice. "How'd you like the fireworks?"

"What? What fireworks?"

"It was all on the monitors here, of course. When we saw the bank robber through the satellite device's optical scanners I called the cops and told them where to go. Then of course I fed in the attack subroutine from here when—"

Bank robbers...attack subroutine... Optical scanners? Of course, Rover's eyes were probably just TV cameras with the signal being monitored back at Tech Square...

"So you were watching the whole..."

She stopped.

Rover was looking at her right now.

"FRED!"

The wolf knelt on his forelegs, and covered his eyes with his paws.

TRANSPORTER
TOPICS

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Number 55

EXCUSES, EXCUSES...

I missed last issue for the same reason that I missed an issue a few months back. I was working on that &<*^$@R game manual! The editor I was working with finished his part and handed the manuscript off to another editor. This individual wrote me a four page letter. In the first paragraph he stated how much he liked the book; the rest of the letter detailed changes he wanted made in the characters, the background and the example adventures. Oh, yeah; "our other projects are all behind schedule, so we want this by the end of November." I spent about thirty hours slaving over a hot computer, Thanksgiving weekend. See, he had to be finished with it by December 15, so I had to get it to him several days before that. The first attempt was a failure. He asked me to send the MS on diskette. Turns out he couldn't get access to a computer which read Amiga-formatted diskettes, so I had to print the thing out (took five hours; I didn't get to bed until after midnight) and send it Federal Express. (He let me use the company's account number.) Then he called that Sunday and spent nearly an hour talking about the additional revisions he was going to make. I tell ya', I'm not sure fame and fortune are worth the trouble.

Short Stories

To reprise earlier news, I wrote a piece for the Centaurs Gatherum Newsletter, using characters I had created for a roll-playing game. It has proven so popular that I have rewritten it and submitted it to Twilight Zone Magazine. No word yet, but people have told me that TZ is very slow reading submissions. I have even written a number of other stories in the same setting, with some of the same characters. These have also proven popular with local fandom. Maybe I have something marketable here. Unfortunately, several magazines listed in Writer's Market note that they refuse to read dot matrix manuscripts. That means that to reach the higher-paying magazines I will have to buy a new printer. So far, the best choice seems to be a HP DeskJet, at around $750. Ouch.

Testing, Testing...

I tested for my fourth black belt in December. I passed, but not before nearly flunking at the start. The instructor asked me what rank I was testing for. I said "fourth black." He said, "What is the name in Japanese?" After I fumbled in panic for several moments, he had mercy and let me go on with the test. Aside from that one bobble it was my best yet. The only criticism I got after the test was that my tiger kata, while incorporating all the correct moves, wasn't energetic enough. The instructor accused me of spending too much time watching my cats. I guess that makes it a "kitty kata."

Odds and Ends

I didn't get the job I interviewed for. On the other hand, I have a new supervisor and a new office at my old job, so things are going better there.

A little contact cleaner has freed the keys on my Amiga.

The convention is now named Future Science/1, and is being co-sponsored by the University of Kentucky Astronomy department. Carl Sagan backed out, but Larry Niven will be here. We are also trying to arrange a screening of "The Wizard of Speed and Time" feature film. The con is the second-last weekend in February.

Have any of you seen the "Space, 1889" game? It looks wild!

Mailing Comments: AT 61

Dr. Gonzo: The streets you describe sound a bit like a low-speed version of I 24, North of Cincinatti. That was assembled from pre-cast slabs of concrete, which have settled unevenly. At certain speeds you hit the resonant frequency of your car's suspension and start bouncing. * Is it just me, or have others noticed that fans in general seem less inhibited about nudity than the general public (at least, the general US public)? On a related note, at the local SF club's recent Halloween' party there was an interesting gender switch. The 'zine editor usually dresses as a male comic book character for conventions. The costume consists of a loincloth, a cape and a pair of cloth "suspenders." At the party, he came dressed as Kitty Pride, of the X-Men, a fairly convincing costume. Once there, his girlfriend changed into his usual costume. However, as she began mingling she had an acute attack of embarrassment. I don't know why; I have seen her in a bikini, and there was only a few square inches difference. She spent about an hour with the cape wrapped around her, then snuck off and changed back. *

Crumbcrunchers: I have been to the Pacific Northwest. Beautiful country, especially once you get away from the cities. * I, too, long for the Pop Tarts of old. *

Audrey & Gabe : (The only puns I could think of for this were vaguely obscene, and engineers are taught to be specific.)

It seems that most fans have been through similar experiences with grade school, usually with reading. I entered high-school at the end of the space boom, and the library was full of technical material on space flight, planetary exploration and so forth. .I worked as a library aide and had a ball. * Have you tried Dorothy Sayers' mystery books? *.

Parenthesis Walk: I hate Calculus (ever had an instructor who refers to it as "the Calculus?"). I failed one semester, and only passed another because an example I studied just happened to be used on the final as a problem. Good luck. Strangely, I find the theories of math fascinating; I just hate the work. *

Uncle Bill: I have a copy of Exploration of Space. How come this book tells more and tells it better than anything published today? I also have Red Star in Orbit, Engines of Creation, and The Noble Gasses. I would like to recommend the following: The Day of the Dinosaur, by L. Sprague and Catherine Crook de Camp; Lucy, the Beginnings of Humankind, by Donald Johanson and Maitland Edey; Connections, by James Burke; The Body in Question, by Jonathan Miller; Seven Miles Down, by Jacques Piccard and Robert S. Dietz (I picked up this one at a library surplus sale, in mint condition); V-2, by Walter Dornberger; The X-Planes, by Jay Miller (a few typos and technical mistakes, but a good reference and history); and Secrets of the Great Pyramid, by Peter Tompkins (don't let the title fool you; this covers the known history of the pyramid and its exploration, and a detailed metrological analysis of the structure). *

Half-Staffed 'Zine (Greg): I have only moved four times in my life, and I was too young to remember the first two times. There is something to be said for a sedentary lifestyle. * Personally, I think the missing mass consists of angels dancing on the event horizons of Hawking black holes. * "Changeling Earth" is an effort at hard science fiction; everything in it is an extrapolation of what is now known or believed to be likely. I haven't seen many TZ episodes, but someone tells me there is a series of books collectively known as the Changeling Earth saga. However, the author hasn't actually used that as a title, and you can't copyright titles anyway. *

Mailing Comments: AT 62

Crumbcrunchers: Your flower beds went about the same way as our garden. (My sister and her family share a garden with me in my back yard.) * See above for a partial description of the only Halloween' party I attended this year. I would love to get "The Planets" on CD. *

Chinese Curse: The University of Kentucky has a hot air balloon race every year at Derby time. When I was a student there

I used to help launch them. The design of the burners is quite interesting, they use the heat from the flame to vaporize the propane and increase burning rate and efficiency. * Your tale of the paranoid supervisor sounds like a mild version of what happens in Kentucky state government on occasion with the arrival of a new administration. Even though the merit system supposedly protects the employees from politically motivated actions, two administrations ago the new Director of Transportation found a loophole; he abolished the positions of dozens of employees and reduced the salaries of several hundred more. This is the same person who cost the state several million in matching funds because the people who usually did the paper work to get them were no longer around. The new guy didn't even know the matching funds existed! * Congratulations on your imminent return to the States. Although there is much to admire in the Japanese culture, it is far too restrictive for my tastes. Of course, some people like that; most Japanese seem to. *

Oblivious Turn: Too bad you aren't joining the Franciscans; I understand they have at least one monastery in Kentucky. (Of course, I've never understood why anyone would need an excuse to move to Kentucky.) Your description of the balding Jesuit who is younger than you strikes a familiar chord. I am the oldest in our regular gaming group, and several of the others are already losing their hair. *

Fresh Water Bonnie: The Russians seem to be about where we were in terms of industrial development about twenty years ago, and in terms of environmental awareness about fifty years ago. Think about it; there were already national parks and many influential people complaining about despoiling our natural resources fifty years ago, and earlier. * Re. Yr. Cmnt. Audrey: My sister, who works for a thoroughbred horse magazine, loves Dick Francis novels. * Re. Yr. Cmnt. Valli: To prevent sunburn you need to increase your intake of antioxidants. I haven't burned in years. Of course, I haven't tanned either. * The mounting wax actually works fine, unless it has been cooking in the waxer for several months (the usual case.) *

MC 'Zine (Barry): I enjoyed Pyro, by the way. * Re. Yr. Cmnt. Me: My mother conspires to give me poison ivy by asking me to do all the chores she that have accumulated around her house before I go on vacation. ("You might not come back.") Since this usually involves cleaning the fence row, and since her fence row is usually infested with the dreaded weed, I get poison ivy. Washing doesn't seem to help, nor gloves. *

Snowdust (to the tune of "Stardust"): See above for my solution to the missing mass problem. * Enjoyed the frankings. Did you see the Nova episode on Erdos? (It might have been another public TV science program.) *

Dr. Gonzo's Bits and Pieces

once again from the hand of Valli Hoski at Via Gen. Guisan 21a, 6830 Chiasso, Switzerland or during the week at 011-39-2-652374 evenings (that is CST + 7 hours for my evening time, not yours).

For ApaTech, February 1989.

Notes in early January...

What an exciting evening. Working in the office to finish a strategic planning report that brought me back from my vacation about a week early. Today just happens to be the Epiphany (6 Jan 89) and is a national holiday. No big deal but everything is closed on this last holiday of the Christmas season. And that includes my local video store so I can't even get a film to watch and while away the evening until Joa is back from his vacation. CNN doesn't take over our local "HomeBuyersTV" channel until after midnight, so it is one of those "what do I do on a Saturday night when all the rest of my friends have dates and the TV only speaks Italian to me" evenings. I know, I can always write for ApaTech. Well, I thought you might be amused to read about one of the more exciting times here in the exotic, unique, cosmopolitan European scene.

What an exciting flight home, thanks to Ronny Reagan. What the Hades ~~is that exiting~~ pomposity trying to do now? To me as an American abroad. And to the Americans at home. Right on top of the reassurance that the PanAm/Lockerbie incident gave to us millions of holiday flyers and the great security we feel in the juggling hands of the deregluated and uncontrolled airline industry, not to say anything of airport security, Reagan goes and gets in a few final hits with Libya. Why me? The last time Reagan had a go with Libya, my passport was invalid for the only time in 5 years, leaving me a bit of a captive audience in the US, hoping that my new passport would arrive by mail before we got involved in some suspiciously warlike escalation at home or abroad. I sure listened closely to the shortwave broadcasts for those few days to try and find out what exactly was going, long before I expected to be told as a loyal citizen what my beloved chief of state was up to. This time, he manages to trade potshots with Libya while I am in the sky between the USA and Switzerland. Wonderful. When I left Chicago, it was all in one piece, relatively speaking; when I landed, the world could have been on a brink of a confrontation if not a confrontation already settled and at war. I have such confidence in our leadership. And what does that have to do with handguns? And equal opportunity regardless of sex, etc. etc.? Or quality education, let alone adequate education? Does it "help him get laid" (TM)? (This is a trademarked and certified Barry Gehm phrase now, the result of that long ago but not forgotten ERA story, for which I still smile and shake the man's hand.)

So I get to be clever and witty for another page. It's amazing how the letters can fill up the page if you don't really try. Look, I am trying to not write another typical holiday vacation story, or talk in Italian about obscure railroad technology.

Well, I feel another travelogue coming on, if I don't rant I should talk about something. No, silly, of course I don't have the last ApaTech to do mailing comments. Why should I be so organized?

Notes on why Milan is so dark during the holidays and Paris is almost as heartbreakingly lovely as Chicago (almost but not quite...)

I don't know where the Milanese put all their holiday spirit, but it sure isn't on display. At least not this year. Or more likely just in different places. When you are used to the holiday season starting in late November, December 1 just isn't right unless the streets are bedecked with dazzling winter lights. However, southern European Christmas traditions are definitely different from northern European or American traditions. Take the city holiday lights, for example.

Paris was so gaily bedecked as to make me think I was happily strolling down the Magnificent Mile again, arm in arm with the city I love. The 2-3 story tall Christmas above the Galleries Lafayette main entrance would have made Rockefeller Center happy. The store windows with their animated Christmas displays attracted crowds of young and old as most GT city-dwellers would recognize. The smell of chestnuts in the air and the innumerable sidewalk stalls in front of the stores did serve as a reminder that this was Paris. Look down the larger avenues and you could see the incredible year-round Christmas tree of the Eiffel Tower. But the stores, what great "magazines" of innumerable items, delicacies, delicate things, and fantasies. After only two hours I was shopped out, or rather I realized that I could only "tour" through. The concept of actually selecting one thing from such an incredible universe of fantasies was ridiculous. But I did find a home, the food "hall" of the London Marks&Spencer store in Paris. What a home, cookies, Christmas puddings, cans of Scottish stew, tea to brew endless cups by, goodies, goodies, goodies. Almost as good as being in London, but not quite. And yes the other amazing memory of Paris, walking down the street eating gyros (which is impossible to find in Italy) and feeling like this is one of the major centers of the world, as is London. Paris is not just a combination of Rome (historical and heartfelt center of a civilisation) and Milan (commercial center) but is an incredible city on its own. Bring your Frommer's guide to help you past the language issue, and you really ought walk, eat, watch and shop your heart out. And don't forget the cotton candy in the neighborhood of the Moulin Rouge.

I should add a note that Milan did put on some holiday lights, even on our street. Seems that their holiday season starts with San Ambrogio and the Immaculate Conception holidays around 7-8 December. But more subdued and less sparkly than Chicago or Paris.

And I did make the holiday season in my own way. I sang the Christmas carol service as part of the choir at the local Anglican/American Episcopal church. It's very enjoyable to be part of a choir again and the group is friendly, much ~~more so than the local American community or the English-speaking Catholic~~ parish. Was a bit strange to be singing some "old favorites" and realize that everyone else's "songs we've sung for years" were very new, sometimes difficult songs for me to learn. And I still don't sing with an English accent. Oh well, that is just one more foreign language to learn.

One of the nicer Ishercons I remember. The only frosting lacking on the cake was the company of Marty and Renee. The stairway conversation with Annette was one of the first times we have talked extensively and I greatly enjoyed it. Other stairway conversations include Alex, acting out the Great Pretender, but suprising me with some comments worthy of his age (chronological not necessarily alleged mental.) And then Mike Walsh and I discussing the personality traits of people from Seattle; I still haven't decided which comes first, if it's Seattle that makes the honesty, the honesty that makes the people, or the people that make Seattle. But at least the honesty of one of my nonfannish friends from Seattle has made our friendship worthwhile.

Thanks to Donna and Tullio for opening their home so that GT could come home again, as always, for New Year's. Thanks to Bob and Connie for being such fine parents, and letting us dote over their very respectable children. Thanks to all who toted their Macs and other hardware, so some of us wouldn't go through withdrawl. Thanks to Dave and Susannah for opening StarWind to our opinions and daring to ask for those selfsame opinions. And thanks to everyone of you who fussed and reminded me that people do care, especially because Italy can seem so far away from all my warmhearted friends. And oh yes, thanks to all the willing contributors who helped me catch up on a year's absence of neckrubs. Gee, I wish someone was around now ... as my neck cracks in dismay.

ApaTech 62, the Mailing Comments

555 Times — Ritual Public Humiliation (TM), eh, Greg? Boy would some of us have liked to have inflicted some on you at Ishercon! But your your absence was sadly noted. But perhaps, next year in Kalamazoo! (Also, sorry for waking you up on Sunday the 22d with our phone call regarding the mailing of our zines.)

DP&SW — Will be Christmas when we read this? More likely well into the New Year, but such are the priveleges of living overseas.//Re yr prekindergarten list...gads, what are the teachers doing if not providing these skills? Before commenting rather lengthily on what I did and did not have to know at age 5, let me ask the other ATers if they think this list is rather extensive. And what are the teachers doing these days if not encouraging these skills and social development in our youngsters? (And I mean your average, not inner city school.)//Susannah, re yr ct that saying that 12th century was old might have been British chauvinism. Maybe, maybe not. I find myself thinking that "gee, this is OLD. Chicagoans/Americans ought to see this and think what OLD really is" as I walk through different European cities. Not that Americans can't understand old or traditions but it does give one pause to stop and consider that the road that curves ahead is built on Roman foundations. Or that a certain building or city quarter had already survived plagues, floods and barbarians, when the young upstart revolutionaries were just firing their muskets or the Yankees and Confederates were going after each other's perspectives of democracy.

Linda — Well, I am excited to hear about your (& Yaz') imminent return. Who knows...can't say why, can't say when, but you might get to read the selfsame news in our column someday.//After visiting Phoenix twice, my best opinion is go north young people, go north (towards Flagstaff). Gorgeous country there. I think Phoenix itself gets real boring especially after all that desert. But that's all for you to discover and tell us about!

Guy — Thanks for yr cts on the train article reprints. I was glad to be able to provide some real railroading news to GT instead of just Amtrak or Conrail reports.//Please continue with your novitiate news. I am following with great interest. Perhaps I will tell you someday about a railroad consultant I know who just became a Methodist minister. He's about 50, has 3 kids, is one of the most balanced and empathetic people I know. I am very pleased to see him in a ministry.

Bonnie — Re other strange geographical facts, or maybe nongeographical facts: Joa tells me that there are still bears in Italy and other wildlife as well. And he's not talking about the Roman derrier pinchers.//A truly geographically related note, or is it just meteorologically related?: Italy is having real problems with a dry winter this year. No snow in the mountains means more than just a poor tourist season. The river Arno is already at record lows in Florence, and the province of Tuscany is asking to be declared a national emergency area, as is Sardegna. The artichoke and corn crops will be affected already. The spring runoffs (or lack thereof) will later impact farming in the plain regions, even the rice fields. Venice has smaller canals which have become unnavigable because the water levels there are going so low. And all this in only mid-January.

Barry — (Leer.) (Isn't that a jet company?)//Re yr ct Joa why "we can't make passenger train travel worthwhile in the US": ask Greg. And see his cts to me in 1 of the more recent ApaTechs.Leer.//What a delight to meet Jo at Ishercon! I am very pleased for you, for her and for us! Talk about added value! I am looking forward to other Ishercons and such and time to talk with and get to know her better. What an excellent woman to add to GT. And yes, please pass these comments on to her. (If I am being discourteous in my frankness, I apologize, but compliments are meant all the way 'round.)//Re yr ct me that Bill peeked: good. Catholic schools and universities leave out some of the more crucial details. But Italian public beaches take care of that aspect of education.

Greg — What a title!//Just in case you missed it the first time around, we missed you at Ishercon. But then again there is always next year in Kalamazoo.//Re yr ct that Keith was up (in Mpls.) "re-measuring the lifetimes and other particulars..." Yes he has certainly re-measured his lifetime and other particulars, as witnessed by his friends and all with the honorable Kathy Ford in East Lansing last November.//While you are speaking of the good old days at GD, reminds me. Anything new you've heard on the space station development project that involved Booz, Allen & Hamilton in the consortium bid that won? None of my former associates are on the project, so I don@t get much news and was wondering if you'd heard anything.

Well, folks, friends, otherwise, time to print and run. Perhaps not up to the more entertaining standards, but at least a few notes in the midst of January. Ciao.

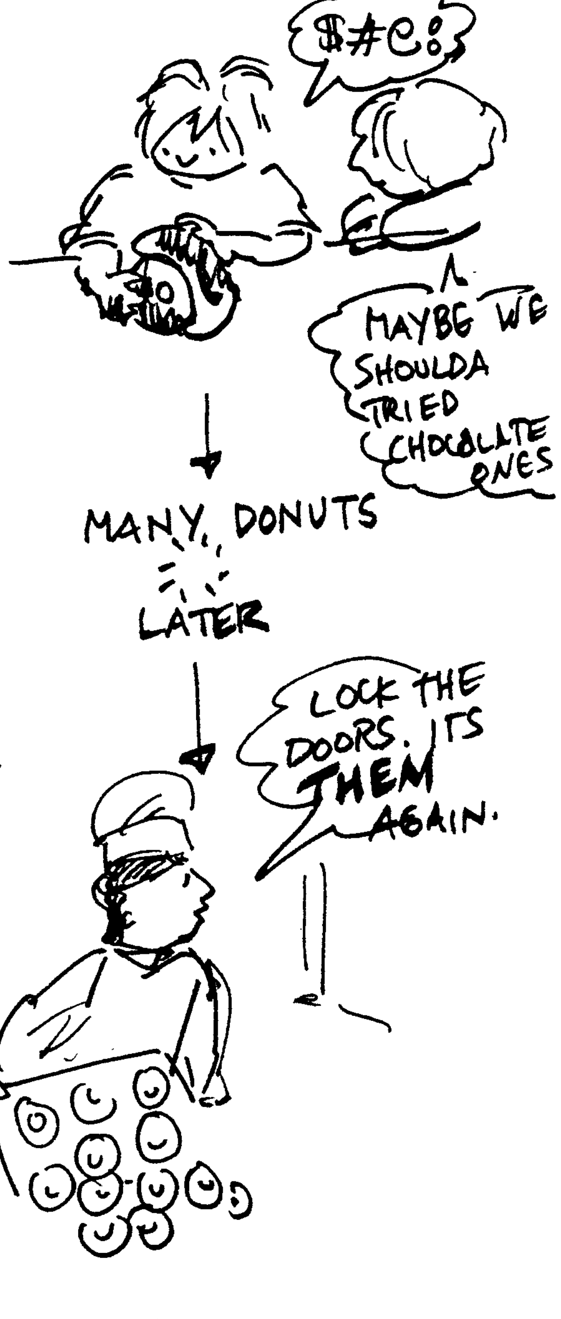
4-D CREAM PUFFS

(From "The Algebraic Topology Cookbook.")

INGREDIENTS

2 solid tori (obtainable at Dunkin' Donuts)

whipped cream (lots)


$#©!
MAYBE WE SHOULDA TRIED CHOCOLATE ONES
MANY DONUTS LATER
LOCK THE DOORS. ITS THEM AGAIN.

GLUE THE TORI (=DONUTS) TOGETHER ALONG THEIR BOUNDARIES.

THIS YIELDS S^3, the sphere in 4-space.

FILL WITH WHIPPED CREAM.

CAUTION: Poke a hole in it before you eat it, reducing it to 3-space.

ALSO: It might not work the first few tries.

Thanks to Mike Postol (fellow math grad student) for technical assistance.

parenthetical perambulations

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YET ANOTHER DISPATCH FROM THE MUSTY (I MEAN HALLOWED) HALLS OF ACADEME . . .

The above address ought to be that of my office, if we are counting the place I spend MOST of my time; the only reason I don't sleep there is that the bed at home is more comfortable. This is something I arranged deliberately so that I would be forced to come home occasionally. However, I do have a bedroll in the office, which my students find very disconcerting. (It's there so I can take the afternoon nap I require after an all-nighter.) My officemate this year is friendly & agreeable, and she goes home at 5 p.m. (even earlier on Fridays) and leaves me to get my work done in the cozy little cubbyhole I have stocked with all manner of petty-bourgeois comforts (hotpot, coffeepot, supplies of coffee--with sugar&cream for my occasional student visitors, Minnesota deepfreeze -a.k.a. a sack from the bookstore hung out the window to keep stuff cold).

The reason for this bohemian lifestyle is that I am taking my preliminary exams for the last time this spring (some days before Minicon). Technically I can get a fifth try, but my adviser (who thinks I am a loathsome & not particularly intlligent insect) has told me that he will NOT support this idea at all, as I don't deserve it. (Nice guy.) So I spend weekends buried eyebrows-deep in such arcana as Sylow p-subgroups, Jordan canonical forms, and obscure counterexamples in topology. The preliminary exam covers undergraduate mathematics (ha ha) so the examiners inevitably put some weird spin on the questions. I've been going through old tests and the questions on them compare favorably with the most difficult problems to be found in my textbooks.

So, with all this hanging over my head, why am I sitting home of a Saturday morning doing the stream-of-consciousness number on my typewriter? A. I haven't written anything for the apa in a while and I was feeling guilty anyway. B. Greg has given me to understand that this issue's contributions have been, well, meager, and I've been enlisted to help fatten it up a bit. (Those of us who see the editor every week are subject to wheedling, begging & outright threats that the rest of you can avoid. So here is a brief commercial: Please, pretty please, write something & send it in, especially you civilians out there!)

No book review this time around, since I don;t read books this quarter (well, I did read one or two, but I told Barry I'd review them for PYRO). However, I do have a franking (from the Notices of the American Mathematical Society) which set me off on several of my very favorite soapboxes.

Lately (as in the last two years or so) there has been quite a lot of rumbling in the American mathematical community about how not enough students are going into mathematics, half the graduating PhD's are foreign (and many return to their native countries), and how the American students they are getting are underqualified.

I've been at the University of Minnesota for more than a year and a half now, and have had ample opportunity to view mathematical education as she is spoke at a large state university. In fact, as a teaching assistant, I have been a (fairly appalled) accessory to the crime. I understand that in some other departments, the process of acquiring an undergraduate degree is fairly humane, but the Institute of Technology (math, physics, chemistry, & various engineerings) maintains an assembly line that would do Henry Ford proud; I think the flunkout rate in the first quarter of calculus is something in the range of twenty-five to fifty percent. The reasons are various: lousy to non-existent freshman advising, dreadful textbook (I've taught out of it and can say that with authority), indifferent to callous teaching assistants (more on that later) and sadistic professors. (One professor last year---my above-mentioned adviser, in fact -- gave quizzes that it took the teaching assistants four hours to work out solutions for. The problems he gave on tests were inappropriately difficult--I found some of them fairly challenging and presumably I've already mastered most of the mechanical difficulties of differentiation and integration. He was unhappy with how his students performed, and used this as fodder for his many and continual assertions that undergraduates at Minnesota are stupid and lazy.)

Okay, you say, so this is how Joe Average does on these things; math departments only want the best and the brightest for graduate students (we'll ignore for the moment whether graduate training in the subject is supposed to be the goal of all this, and ignore the existence of physicists, chemists, engineers, and computer scientists--ie. the folks who might want to use the stuff without immersing themselves in it for life.) I don't see any effort at all at recruitment going on, even among students who are taking courses with graduate students. An undergraduate mathematics major, cannot get the time of day in this departmnet unless he/she is brilliant and has captured the attention of one or more big-name professors. ("Brilliant", in this context, means "has mastered all the material that the professors think is trivial, easy, or basic." Trust me, most of us don't qualify as brilliant.) Because I am a patriotic citizen of the "mathematical community" so-called, I've started my own recruitment program; if I pass my tests I am taking on two students this summer in a tutorial on how to do proofs. One is eighteen and the other is (I guess) in her early twenties: and both have the enthusiasm and the courage necessary to run the gauntlet presented by the institution. Most importantly, both of them are passionately in love with mathematics, which is the first prerequisite.

Life is hard for the undergraduates (who are regarded as some low form of scum); it ain't great for the graduate students either. At this school, anyway, the professors seem to feel great contempt for the American students, regarding them as "not serious" and "poorly prepared"--almost as though those two thinkgs were the same. The undergraduate institution with the largest representation among our department's graduate students is the University of Beijing, followed (at a great distance) by the University of Chicago. I have great respect for the dedication and tenacity of the Chinese students; many of them leave their spouses and families behind in China in order to come here to study. But they are ahead of the American students (on the average); they invariably have master's degrees or the equivalent, and their preparation is unquestionably superior to ours. Nobody goes quite so far as to suggest that the folks from the Far East are a master race, but they don't seem to take into consideration that as a society, China gives a damn about education, and the United States doesn't. Furthermore, when I hear my professors (only some of them, to be fair) going on about the many and marked educational inferiorities of American students, the hypocrisy is what really infuriates me. These people are perfectly willing to take the superior products of someone else's educational system; they are willing to *complete* the work done by elementary, secondary and university teachers in another country--but as a profession, they are not willing to do such work in their own country. If teaching were considered a Good Thing, a worthy work, would they hand the bulk of it over to graduate students? I'm well aware of the "publish or perish" pressures--I suppose I'd like to know why publishing, even a string of mediocre footnotes to someone else's work, is considered more important and more worthy than teaching.

Just how unprestigious is teaching? If I didn't know already, I could read it from the attitudes of my fellow graduate students. I've been sneered at for actually holding my office hours (one clever fellow congratulated himself on his success in discouraging students from coming to his office or making them feel vastly unwelcome once there) I've also gotten trouble for being willing to make appointments outside of regular office hours (by the way, that's part of my contract). I'm under the same time constraints as these people, and I am just as serious about my work, but I also feel an obligation to do the job I was hired to do. (Yes, the time requirements for a T.A. are pretty horrifying if you arent' organized, but even if you do a really conscientious job, it only comes to about twenty hours a week.) Furthermore, I've gotten lots of advice from women graduate students at various schools to resist being nudged into the math education track, since that's how they try to get rid of the females who somehow or other make it to graduate school. So what is clear is that teaching is scutwork, the intellectual equivalent of cleaning the latrines, work that is so wearisome that it is consigned to the women and the underlings.

(By the way, I think this lies at the root of the shortage of qualified teachers that has arisen in the last generation or so. The "dedicated" and certainly underpaid minority & female schoolteachers of yesteryear were making a virtue of necessity in not complaining overmuch about their pay; when other opportunities became available, the best-qualified members of both of these classes went elsewhere. I would teach high school these days in the same spirit that I would join the Peace Corps -- for a few years, no more, and certainly not as a lifetime career.)

That's an overview of what bothers me about mathematical education at the college and graduate level. However, the things that are really wrong permeate the system from top to bottom. When I first arrived at Minnesota, we had T.A. training for a week or so. One of the professors running this orientation session had these words to say to the foreign T.A.s: "You will have to realize that Americans have a lot of strange ideas about mathematics. One of them is the notion that hard work has nothing to do with success." Now this certainly doesn't fit very well with what every two-bit politician & pundit claims is our national ideology, which is that even the humblest of us can elevate his/her/its position by lots of hard work. But it does fit, and very well, with my own experience in school. When much younger, I got praise for being "smart"--when what I was, was well-read. When I switched fields from philosophy to mathematics, in college, I got sneers for being "dumb"--when what I was, was inexperienced. For the most part, very few of my teachers actually tried to teach: they took our present state of knowledge as an indicator of our capacity, and treated only the "smart" ones as if they could learn anything. The mania for "aptitude tests" is another face of the same syndrome: most laymen and not a few professionals (and not all in the social sciences, either) take the SAT and its cousins as measurements of actual "ability" or "potential", when what they are is measures of how well one copes with multiple-choice questions (not particularly well-contructed ones,I might add) and whether or not one has seen the material in the tests before. People in all walks of life seem to have this mystical belief that one is either "good at math" or "not good at math" and that the testing gurus can tell you which you are.

And while we're loudly lamenting the lack of qualified students, let's ask why untold hundreds of thousands of dollars are spent on studies purporting to show why one part of the population or another is genetically incapable of doing mathematics (or other intellectual work--but math is a popular choice since everyone is afraid of it). I recently looked up the famous (or infamous) Benbow and Stanley paper in Science, which claimed to show that females had a genetic incapacity for mathematical thought. (This paper was recent, in the last five years, in fact.) The data, if you can call them that, were someone else's results from giving the SAT as a "true aptitude test" to seventh graders, in an effort to ferret out students with "mathematical ability". How did the authors try to eliminate the effect of discriminatory social attitudes? Well, they asked the girls who participated in the study if they felt as though they were discriminated against in school. Furthermore, in the last paragraph of their paper, they said that lots of hypotheses could explain the result that girls didn't do as well on the test as boys, but they liked the one that genetic factors were involved! There was no biological data in the paper at all, except for some references to a study that suggested a correlation between testosterone levels in the womb and various sex-linked characteristics... This society is paying scientists (or self-proclaimed scientists) to prove that women, blacks, and members of the other out groups shouldn't even be considered as candidates for the scientific professions.

About a year and a half ago in this apa I wrote an essay asking which was worse, bad science or pseudoscience. I suppose now I have to answer forcefully and decisively in favor of bad science. The widespread popularity of scietology, astrology, New Age mysticism, and so on have affected my life not one whit. But the rotten undercurrent of biological determinism that lies behind the studies of the sort I mentioned above, and the bad epistemology that claims you can detect an "aptitude" that is not already developed, have shaped the course of American education in this century. Yes, there are mathematics students who might live to outshine Gauss, and English students who might dwarf Shakespeare, if they were given the fullest encouragement and cultivation. But you don't have any way of knowing which these are, and the only way to see who they are is to encourage EVERYONE. This is precisely what has not been done in this country with respect to mathematics.

What I claim is that the educational establishment has done the following: They have thrown out all the women, all the black & Hispanic men & women, they have reduced the pool to white middle class males, and then they have commenced whining because this tiny group still isn't good enough: they have to pare it down still further. This isn't a deliberate, conscious policy, of course, and there are a lot of social forces behind it (those which allow the severe underfunding and underequipping of lower-class neighborhoods' schools, those which encourage the notions that certain people are infereior--if you're naturally stupid, why try?) There is also the problem that the mathematics departments have consented to be the gateway to the engineering professions, in the sense that mathematics courses are "weedout" stations, much as chemistry courses weed out prospective pre-meds. In meetings on grading policy I have encountered truly vengeful attitudes: "We want to give as few A's as possible because these people are performing below any reasonable standards and we want as few of them taking the next course as possible." Certain courses in my department are designed to flunk a quarter of the peole who take them. (These are mostly terminal courses designed for business majors.) The battle cry of the reformists is "Calculus ought to be a pump, not a filter" (i.e. a recruiting tool, not a weedout device), but I don't think that will come to pass as long as the other departments depend upon mathematics to do the dirty work of selection for them. There is also the issue of remedial work: if you have students who are underprepared, do you scream at them for being idiots, or do you set about correcting their lack of knowledge (which is generally their teachers' fault)? If the mathematics community truly wanted to recruit new members, I think you'd hear a lot more--and from research mathematicians, not just members of the "math education" ghetto-- about the importance of bringing people up to speed. I think that their present attitude is one of petulance that the elite is herding toward the better-paid professions (engineering, computer science).

MAILING COMMENTS

BARRY: Actually, I was thinking of Turing when I wrote the piece on homosexuality. I'd been picking my way through the recent biography by Andrew Hodges (Alan Turing: the Enigma) this summer. Maybe some time I will finish it and attempt a full review. I was also aware of other psychiatric atrocities perpetrated on homosexuals from reading stories and memoirs about American gays & lesbians in the 1940s and 1950s.

Yes, I'm very happy to do book reviews for PYRO, and the mass of them will probably be written in my infinitesmally small free time (e.g. the two days I have between the prelims and Minicon.)

GREG: Thanks for the franking on Erdos. Some of the stories I'd heard before, but the whole article was fascinating. On Erdos' addiction to dexedrine and other stimulants: A mathematician friend of mine talked to a nurse who is an expert on narcolepsyand it' seems likely, given the anecdotal evidence, that Erdos suffered from that disorder (there are lots of stories of him falling asleep at totally inappropriate times).

The other thing that strikes me is what a monster (i.e. an unnatural phenomenon) Erdos was. I do not think it does particularly good things to one's soul to be perpetually insulated from the duties and realities of everyday life. (I freely grant that the practice of mathematics occasionally required one to be a complete fluff as regards the mundane universe.) It also strikes me as rather insulting (not to mention ungrateful) for him to refer to women and men as "masters" and "slaves" respectively, when he seemed to have been coddled and provided for by a good many women (starting with his mother and ending with the wives of his colleagues).

LINDA: Good title ("Interesting Times"). Job hunting is bad enough but flying around the world to do it . . . I enjoyed meeting you and Yas at Ishercon last year, and am glad you had some fun on your trip.

GUY: Re your comments on mystery novels: I only started reading them last summer & the summer before. (I knawed my way through Sam Paris' whole collection of Dorothy Sayers novels.) I agree with you about the importance of good characters. I don't think I'm living in the same universe as the people who claim that characterization isn't important, e.g. in SF novels--that the "idea" or the "plot" is all that matters. I'm more convinced by an alternate world (and all the worlds described in novels are "alternate"--even a mystery novel's version of the south side of Chicago) if I am convinced that its inhabitants are real... and of course, I'm the sort of picky hedonist who doesn't like to read about bores, jerks, or cads.

I would have liked to have gone to MIT, but my parents were against the idea ($$$, plus I suspect they were worried I'd be encouraged in my eccentricities).

MORE MAILING COMMENTS...

ANOTHER ONE FOR GREG: Really awesome cover. I am jealous. Sincerely. (This must be the second-sincerest form of flattery: "I wish I'd done that.")

BONNIE: Nice piece (albeit brief) on the Aral Sea. You write good geography & ecology pieces. We (the royal we) your devoted fan club, would like to see more of them. Like, you write good.

Like the house! Does this make you a respectable member of the landholding classes now?

I am sincerely disturbed by the song "Don't Worry, Be Happy", let alone by the thought that anyone would see fit to use it as a campaign song. Of course, I speak as an inveterate worrier, but it seems to me an advertisement for lobotomy.

SUSANNAH: Entertaining account with life with an epsilon (sorry, I've started using that, thanks to the Erdos article). I have to confess I don't go to the Halloween "haunted houses": at 27 that stuff still scares me.

UNTIL NEXT TIME.......

have a good one.

(This is a useful signoff, equally appropriate for friends & enemies alike. With friends, as here, it means, "Good fortune and may the heavens smile on you", or something of that ilk. With enemies, it means, "If the gods get around to zapping you, I hope they're thorough about it.")

MATHEMATICS FOR A NEW CENTURY

Lynn Arthur Steen

Lynn Arthur Steen is Professor of Mathematics at St. Olaf College in Northfield, Minnesota. The following is his Survey Lecture for Action Group A5 (Post-Secondary Mathematics Education) of the International Congress on Mathematical Education. The Congress was held in Budapest from July 27 to August 4, 1988.

Mathematics is an ancient discipline vested with modern authority. Mathematics empowers people with the capacity for control in their lives; it offers science a firm foundation for effective theories; and it promises society a vigorous economy. In all cultures, in all generations, children study mathematics to gain access to a better life. In this respect, today is no different than yesterday, the twentieth century no different than the eighteenth.

But in other respects the world has changed—significantly, profoundly, and irreversibly. Until recently, school mathematics (mostly arithmetic) sufficed as the language of commerce, while higher mathematics was viewed as the language of science. No more. Today international commerce is based on computer models of trading that employ such sophisticated tools as stochastic differential equations, while medical research relies nearly as much on mathematical models as on clinical evidence. Indeed, the language of advanced mathematics—from control theory to combinatorics, from differential geometry to statistics—has permeated business, medicine, and virtually every information system of modern society.

Computer-based communication has created a world economy based as much on exchange of data and ideas as on shipment of goods. In industrialized countries, as much as half of the labor force is now engaged in information-based work, while in developing countries information-based industries are often the fastest growing segment of the economy. Mathematics is part of this new world order, an amplifier of the mind that bestows significant personal and economic advantage on those who possess it.

Implications for Mathematics Education

The new reality in which we all live, this high-tech prelude to the next century, augurs important changes for the context in which mathematics is taught in universities around the world. Different countries will experience these changes at different times and in different degrees. But none will escape the winds of change unleashed by the power of modern computers and innovative applications.

One might naively expect that as mathematics increases in its applications, good students would flock to mathematics in increasing numbers. But what we observe is quite the opposite: high demand mixed with low quality threatens post-secondary mathematics in almost every country. Before trying to understand this paradox, let us examine the evidence:

1. Shortage of Secondary School Teachers.

As demand for mathematics rises, demand for instruction in mathematics also rises. But this same demand attracts graduates to jobs other than teaching, because pay and job conditions are often much better outside educational institutions. The combination of increased enrollments with decreased numbers of prospective teachers creates shortages which are already being felt in many countries:

- *From Western Europe:* "Fairly soon, secondary school mathematics will be taught by people who are absolutely not qualified. It isn't yet as bad as the United States is right now, but it's pretty close."
- *From a Developing Country:* "Many mathematics teachers in our secondary schools have not taken *any* post-secondary studies."

2. Weak Mathematics Preparation of Entering University Students.

Two factors account for this trend, which is widespread in all regions of the world. Wherever secondary school mathematics teachers are poorly prepared, their students are likely to be poorly prepared. Even in countries with well qualified mathematics teachers in secondary schools, the many attractive new career options in computer science, business, and medicine often distract good students away from serious mathematics even before they enter the university. When careers in mathematics become only a second or third choice for many able students, university mathematics departments are bound to notice both a decline in the average preparation of entering students and, perhaps more important, an increase in the variance:

- *From Western Europe:* "The wide range of qualification levels at the end of secondary education prevents a uniform starting level in post-secondary education."
- *From Eastern Europe:* "The growing difference in preparation presents some problems at the university."
- *From a Developing Country:* "Since about 1970, the general level of mathematics preparation has been decreasing, and right now is *very* inadequate."

3. Declining Student Interest in Mathematics.

The very professions that use mathematics extensively provide attractive and financially desirable alternatives for expression of mathematical talent. For most students who want to make a contribution to society, traditional pure mathematics appears to be of limited interest when competing with more visible careers such as engineering, medicine, computer science, and finance. Careers in these more "practical" fields now pose stimulating challenges to the mathematical interests of the young student, comparable in intellectual reward and attainment to traditional mathematics.

- *From Western Europe:* "Our most serious problem is the attraction of engineering and computer science at the expense of mathematics."
- *From a Developing Country:* "Intelligent students now choose areas such as health sciences and engineering; mostly second or third rate students choose to study mathematics."

The evidence is clear from around the world: As mathematics becomes more applicable, able students flock to the disciplines that use mathematics rather than to traditional pure mathematics. Student preferences pose a direct threat to the health of post-secondary education—where student choices are most noticeable—and destabilize secondary education as well by reducing the number of well-prepared mathematics teachers. In extreme situations, declining student interest in mathematics can lead to chronic shortages of well-prepared teachers, thereby establishing a negative feedback loop which rapidly drives the whole system of mathematics education into a state of crisis. It is as if we wired our home thermostats to shut off whenever it got too cold: as fall turns to winter, we'd soon have no heat whatsoever.

Standards of Stability

Comparisons with the past are of limited value when analyzing problems of today. It is too easy to fall prey to the merchants of nostalgia who wish for restoration of a dream from the past. What is needed instead are standards by which the post-secondary system can be judged, independent of particular transient effects. Data from many countries around the world reveal some patterns that appear to transcend the great differences in educational systems. For example:

- In most industrialized countries, between two and three out of every million citizens earn a doctor's degree in mathematics. Only in developing countries and in the United States are doctoral productivity patterns significantly below this level.
- About 3% of university degrees are in mathematics, in both industrialized and developing countries. Despite wide variation in the availability of university education, in virtually all countries this percentage varies only from 1.5% to 4%.
- Most countries produce annually from 20 to 40 university mathematics graduates per million in the population, although a few industrialized countries are much more productive, with averages in the range of 60 to 80.

For a hypothetical country with a stable population, universal secondary education, and university education for 20% of the population, one would expect for each million citizens to need about 25–30 university graduates each year just to maintain the supply of secondary school teachers, and about 3 doctoral graduates to replenish the supply of university faculty.

Although neither these data nor estimates are based on very firm evidence, they do suggest that the norm in most industrialized countries at this time is that the educational systems produce just about enough mathematics graduates to replace themselves, with little left over to support an increasingly mathematicized society. It is not surprising, therefore, that in the face of increased demand for mathematically trained graduates, most nations are reporting shortages of teachers and weaknesses among mathematics students.

Changes in the nature of mathematics and society—increased usefulness of mathematics, increased mathematization of society—have shifted significantly the delicate balance between supply and demand of mathematically-educated university graduates. This shift suggests the need for structural changes in the way mathematics is taught in institutions of higher education, to insure that post-secondary mathematics programs continue to meet the increasingly diverse needs of society. The direction of change will be determined by the impact of several significant forces that influence university mathematics programs: computers, new applications, research in learning, research in mathematics, and socio-economic trends.

Impact of Computers

The most obvious force for major change in university mathematics is the rapidly increasing impact of electronic computers on the way mathematics is practiced. Computers have influenced mathematics in two quite different ways: they have made mathematics more powerful than ever before, and they have altered the very nature of the mathematical sciences. Computers are now commonly used in mathematical research of all kinds, both pure and applied; they have altered the balance among subdisciplines, posed new problems for theory, and provided new tools for exploration and proof.

Unfortunately, this new intellectual balance within the mathematical sciences is rarely reflected in school or university curricula. In most countries, computers have had only a very slight effect on post-secondary mathematics education, and then only in a few industrialized countries. Indeed, many countries report *no* significant post-secondary curricular change in the last 25 years—a period during which the entire computer revolution has occurred. University mathematics curricula are virtually immune to change; in mathematical terms, we might say that the mathematics curriculum is invariant under intellectual revolutions.

It is surprising that computers have had so little impact on the university mathematics curriculum. Lack of hardware, a very real problem in many countries and many universities, is more a symptom than a cause. The real issue lies much deeper: a lack of will.

Mathematicians are notoriously conservative in curricular matters, and resist changing their courses even if they regularly use newer techniques in their own professional lives.

Apart from actual use of computers, the impact of algorithmic approaches to mathematics cries out for a prominent role in the undergraduate curriculum. Such subjects as computational complexity, dynamical systems, scientific computation, and visual data analysis have blossomed in the last quarter century, but are hardly noticeable in the current curriculum. Much could be done to introduce these topics early even without actual use of computers. But most faculties do not make that effort, preferring instead to rely on the comfortable classical curriculum. Is it any wonder that good students no longer find mathematics an attractive subject?

Impact of New Applications

A second factor that suggests the need for major revitalization in undergraduate mathematics is the dramatic increase in breadth of application of the mathematical sciences. No longer are engineering and physics the prime users of undergraduate mathematics. Sophisticated techniques from yesterday's research are routinely used in today's applications.

Consider the biological sciences: differential equations are used in physiology, as are combinatorial methods in genetic sequencing, knot theory in modelling DNA, graph theory in neurophysiology, mathematical modelling in protein engineering, statistical methods in clinical trials, and probability theory in epidemiology. The list of new applications could go on indefinitely: mathematical biology is one of the most exciting frontiers of applied mathematics today, a great showcase for the power and versatility of mathematics. These mathematical tools have helped push biological research to the frontier of science: understanding life and intelligence is *the* scientific challenge of our age, and mathematics plays a central role in this venture just as it did a century ago in the quest to understand the nature of matter.

Similar mathematical methods are used increasingly in environmental science, in natural resource modelling, in economics and sociology, in psychology, and in cognitive science. In these newer disciplines, mathematics offers structures for understanding (and hence controlling) many of the factors that affect the quality of life on earth. Mathematical ideas are even finding their way into the fine arts, as computer tools are used by graphic artists, film makers, and musicians.

New applications have unquestionably changed the character of the modern mathematical sciences. They have changed not only how mathematics is used, but also the problems on which mathematicians work. Science has always inspired much of the most interesting mathematics, and this decade is no exception. Especially because of the natural attraction of diverse applications to so many students, it is perhaps surprising that these applications have had so little impact on the post-secondary curriculum.

The answer, once again, seems to lie in the natural curricular conservatism of university mathematicians. By maintaining a curriculum from the 1950s that is narrowly focused on traditional topics from mathematics with applications to engineering and physics, we give students the impression that mathematics is a discipline rooted more in the past than in the future. Nothing could be further from the truth, although one cannot blame students for not knowing this. We never tell them.

Impact of Research on Learning

Those who study the way students learn have accumulated convincing evidence for something that observant teachers have known for generations—that students retain more of things they learn by themselves than whatever they memorize for a test. Effective teaching requires that students be engaged by what they learn, not only that they pass tests based on effort of preparation.

The conclusion of this research should not surprise any experienced teacher. What is new, however, is evidence suggesting a mechanism that helps explain why learning takes place this way. Teachers normally act as if each student's mind is a blank slate—or an empty computer disk—on which effective teachers can record whatever information they like. Research in cognitive science suggests otherwise: each student's mind is more like a computer program than a computer disk. Each student brings to the mathematics classroom a rich set of prior mathematical experiences that provide a unique mental framework in which the student creates new patterns derived from new experiences. Learning occurs not in the act of remembering, but in the gradual development of mental frameworks unique to each individual. In other words, students learn by modifying their mind's program, not by storing new data in their mind's memory.

Some of each student's experience is based on school lessons, but much of it is learned from the ambient environment in which the child lives. Those at this Congress who are discussing ethno-mathematics can document example after example of student-generated mathematical algorithms derived from street experience rather than from school. Scientists who supervise students in laboratory work know how much more is learned with the hands than with the mind alone. Students who work with computers learn incredible detail simply by interaction with the machine—detail that they have never been formally taught and that would be very difficult to teach by any other means. Learning requires engagement, not just activity.

I hardly need point out that most post-secondary mathematics—indeed, most mathematics at any level—is taught by lecture, with homework exercises for practice and examinations for enforcement. Lecturing and examining may be the easiest way to teach mathematics (or perhaps just the cheapest way), but they are by no means the most effective. Few students can learn mathematics well from lectures and homework alone. In the past, those few may have been all the students in our classes, sufficient in number to meet the needs of society. Today these few are the teachers and professors.

But now, with increased need for mathematics by students of many different interests, the deficiencies of this style of pedagogy are increasingly apparent. Effective teaching for today's students requires a more diverse repertoire of approaches, including in addition to lectures, homework, and examinations, new opportunities for group work, for extensive writing, for oral practice, for exploration and experimenting, for modelling projects, and for computer activities. Students need to experience mathematics as they learn it, and not simply study it in preparation for exams.

Impact of Research in Mathematics

Despite its ancient roots, mathematics continues to grow and change. What we call classical mathematics—in theory and applications—is largely the mathematics of the nineteenth century. In the first two thirds of the twentieth century the emphasis of mathematical research shifted to abstraction and axiomatic foundations, even as applications of mathematics to the physical sciences reached the point of what Eugene Wigner called "unreasonable effectiveness." Virtually all mathematics taught in university courses today is this classical mathematics of the nineteenth and early twentieth centuries.

However, in the last thirty years, mathematics itself has undergone a renaissance as creative and breath-taking as the parallel but better known revolutions in biology and computer science. These discoveries have affected both theory and applications, changing significantly the very character of mathematics:

- *Number Theory.* The digital character of computation has thrust number theory once again into center stage of mathematics, with new approaches to classical problems (for example, elliptic curves) producing unexpected dividends in the theory of computation, in mathematical logic, and in applications to the security of data transmission.
- *Statistical Science.* As data deluges science from every source—from economics, from telemetry, from laboratories—statistical methods form a continually changing interface between information from the world and analysis by mathematical methods.
- *Optimization.* Beginning with the simplex algorithm for linear programming and moving through recent interior methods devised by Karmarkar, mathematical optimization has joined the frontiers of mathematics both in challenging problems (to find optimal solutions) and in effective applications (to improve efficiency and reduce waste).
- *Visualization.* Converging ideas from research in perception, in computer graphics, and in geometry are now producing innovative theories of perception that draw on such diverse specialities as differential

geometry, combinatorial algorithms, data structures, and engineering.

- *Dynamical Systems.* Recent research on fractals has shown how iterated order often begets chaos. Models of chaotic systems have permeated science and spawned whole new areas of research in mathematics; applications range from data compression in storage of photographs to theoretical models of instability (in stock markets as well as in the solar system).
- *Decision Theory.* Whereas continuous models from analysis provide apt models for the physical sciences, the discrete models of game theory, social choice functions, and expert systems provide more appropriate tools for the human sciences which depend on decisions, votes, and choices rather than on continuous change.

During the last thirty years, mathematics has been transformed into a rich collection of mathematical sciences, tightly coupled to each other through interlocked theory and linked to the world of science and business by an increasing network of applications. Unfortunately, few university students see mathematics in this way—as a vibrant, living discipline ready to engage their minds and careers in a stimulating contemporary challenge. More often than not, students see mathematics as part of history, as a collection of tools developed in some previous era whose scientific problems are now passé.

Impact of Socio-Economic Factors

It is no longer true in any country, if it ever was, that universities can function as islands of intellectual innocence amid an ocean of turbulent social change. All over the world, governments and students are increasing the pressure on universities to better meet the needs of society. Often these pressures are conflicting, overwhelming, and contrary to the traditional mission of universities. Like all subjects, mathematics is weakened when the strains on the universities become too great.

Four issues seem widespread in reports from around the world:

- *Overcrowding.* Public pressure for increased enrollment is common in virtually every country. Sometimes this pressure is caused simply by increases in the number of university age students; other times it is part of a conscious government decision to increase access to higher education as a means of furthering the educational expertise of the country. Moreover, since jobs are often hard to find while the status of "student" is frequently a comfortable refuge from adult responsibility, students often pursue very leisurely routes to their degrees. It is not uncommon in some countries for the majority of students to never finish.
- *Underfinancing.* Some countries are struggling with run-away inflation; others are insisting on stricter accountability from higher education for producing graduates useful to society. In either case, universities everywhere are under considerable financial pressure. Severe cutbacks are not at all uncommon. Because of the increased world-wide demand for mathematics, these problems often divert mathematically trained personnel from one country to another, sometimes causing "brain-drain" that reduces the intellectual resources of those countries that can least afford the loss.
- *Links to Jobs.* Many countries now experience the paradox of unemployed university graduates at the same time as positions requiring university degrees remain unfilled. Most often this is due to the difficulty of properly matching university work with job requirements; neither centrally planned economies nor free market systems seem able to solve this problem efficiently. Problems arising from socio-economic circumstances are significantly aggravated by a university mathematics curriculum that typically trails by fifty years the mathematical methods actually used in contemporary business and science.
- *Diminished Quality.* As numbers prevail over standards, universities everywhere find that students are either unable or unwilling to undertake the type of rigorous curricula that have traditionally been the hallmark of university education. Elitism clashes with populism more directly on a university campus than anywhere else in society. Higher education is the crucible for this debate, and mathematics, to the extent that it provides the key to opportunity, is the principal fuel that heats this crucible.

Revitalizing Post-Secondary Mathematics

Signs from around the world make clear the urgent need for revitalization of post-secondary mathematics education:

- To attract good students to mathematics;
- To encourage potential mathematics teachers for secondary schools;
- To provide mathematical expertise for industry and government;
- To support advances in science and engineering;
- To help improve secondary education in mathematics.

Many strong forces influence university mathematics education. We have touched on only a few: computers, applications, research in learning, research in mathematics, and socio-economic factors. Because these forces are so strong, change in post-secondary mathematics can only be accomplished by channeling these forces to constructive ends. Yesterday Geoffrey Howson advised us to build a surfboard—instead of continuing vain attempts to stem a tide generated by uncontrollable forces. I prefer a slightly different metaphor: a sailboat tacking against the wind. Like a captain of a sailboat whose course is set against the prevailing wind, mathematics educators must learn to use the winds of change to our own advantage.

The most important task for post-secondary mathematics is to make it attractive as a subject of study for students with a wide variety of interests. University mathematics is good preparation for many different careers. Students these days see and expect personal and scientific challenges in many other fields, so they expect it also of mathematics. Those of us who teach in universities must:

- Teach modern mathematics as well as classical topics, not just to advanced students but also to beginners;
- Display the power of mathematics not only through its logic but also through the enormous variety of its applications;
- Show students that computers are a natural ally in mathematical practice—as a source of ideas, a device for visualization, and a tool for calculation;
- Engage students in the mathematics they study by developing new instructional strategies that involve students as active apprentices in the craft of mathematics;
- Make mathematics a pump rather than a filter in the educational pipeline, to insure that students of many different interests benefit from university study of mathematics.

Such changes will have significant beneficial effects on university mathematics programs, and by extension on school mathematics, as well as on science and society. Curriculum revitalization must involve new approaches, new priorities, and new examples that reflect not only mathematics of past centuries, which we all studied, but also mathematics for a new century, which our students will need.

MISSING GALAXIES, INFINITE TEMPERATURES, AND THE CAT(ENARY) WITH THE RELATIVISTIC TAIL

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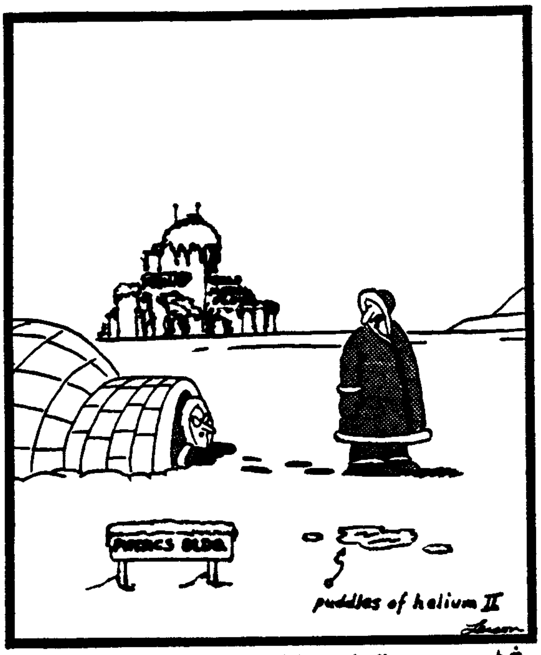
"ANOTHER SLIM VOLUME OF DARK MATTER WORKSHOP PROCEEDINGS!" SHRIEKED JACOBSEN



"Well, it's cold again."

I made it through the worst part of the winter, so I guess I can still take it after four years in "paradise." I know I'm becoming acclimated when I find myself thinking of 20° F. as "warm."

The holiday season was reasonably pleasant on the whole. I spent a week in Dallas in a monster hotel-office complex in the company of a couple hundred physicists, getting utterly saturated with theories (and a few experiments) both plain and fancy. I've now heard enough about "missing mass" to convince me that it isn't mislaid, it's probably just in the garage behind the paint cans and the plant food. (The article for **Pyro** will have to wait for spring break, after I finish all the writing I have to do for one of my classes.) While I was back in New Jersey, Guy came out for a day to visit and talk about all sorts of interesting things (some of this as my niece and nephew were tearing about the house). Shortly after I got back here and the winter quarter began, Andy and I drove over to St. Paul and the Minnesota Science Museum to see the travelling exhibition on robots that Digital is sponsoring. It consisted largely of static displays and featured the kinds of electronic abilities and expert systems that everyone here is probably already familiar with. It's worth a visit, but will probably hold your interest for only about an hour or so.

Classes could be going better, but only if I gave up sleep and could magically still function. The course in extragalactic astronomy has no textbook, but requires a lot of supplementary reading, since the instructor has asked for weekly reports on what we've learned. This sounds all right in principle, but I sometimes find myself spending days trying to read enough to figure out what's going on in a particular field. This is in addition to preparing an end-of-the-quarter 20-minute presentation: mine is related to some points concerning the cosmic distance scale and why no one can be sure we know how far away anything is. Unfortunately, all of this has really cut into the time for my physics courses; I'm going to have to brazen out one of them or dump it soon and try it again next year. I'm finally starting to learn how to distribute my time (**no** extracurricular reading during the quarter), but now I'm not sure there is **enough...**

Annette and I are on our way down to Capricon this coming weekend. Fortunately (and perhaps not coincidentally), Minicon up here is at the end of spring break, so I will properly be able to spare the time (whereas we'll be dragging homework to Chicago...). I'll be all over the place in May and June. My AIAA Technical Committee meets in Crystal City again early in May, so I'll be stealing a couple days from classes for that. I'll be writing the annual review article on Space Science and Astronomy again for **Aerospace America** and will also have a hand in planning the relevant paper sessions at the 1990 Aerospace Sciences Meeting. I'll be down in Chicago again over Memorial Day Weekend for the International Space Development Conference (and will probably be carting homework along). Right after the spring quarter ends, I plan to attend the American Astronomical Society meeting in Ann Arbor, a place I've missed visiting for years now, on my way to visiting my folks in New Jersey. I plan to spend the summer on real research and studying the physics I'm supposed to know (the qualifying exam is in fifteen months). I won't be at Noreascon because I'll have already spent the trip money to get to Pasadena for my Committee meeting, the Second International Conference on Solar System Exploration, and the Neptune encounter (!), after which I'll hit San Diego for a few days.

The APA reaches its Tenth Anniversary around July (#65); let's do something special! See you or read you soon!

MAILING COMMENTS

APA-TECH 61

Cover The **really** cruel part of the Möbius-strip exercise wheel is that **half** the time it looks like you really **are** getting somewhere...

Valli Seventeen pages of frankings in Italian?! (And people say **I'm** arcane...) I can't quite manage enough Romance language cognates to read much of the articles, but the pictures are real **neat.** (Isn't it wonderful what can be done with a well-maintained copier?)

Calling a magazine **Tutti Treni** seems redundant: everyone knows that's the sound they make! ("Does this cab go to da Loop?")

I hope you weren't involved in any of the giant auto accidents they just had in your area. Hope to see you and Joa out this way on one of your transatlantic oscillations...

Susannah I'm a little confused as to who "we" are in the course of your narrative: did Marlene come along mountain-climbing? (What did she think of her first plane ride? My nephew was stupendously unimpressed...)

"Superball Beach" sounds like it ought to be a story title or something. (It also makes me think of the beach in **The Prisoner.**)

A diffraction-grating rocket decal on her helmet? So now Marlene's going to be a fireman on a spaceship? (Dang, those unions are strong!) I'd like to get more of those things, but I got the last batch at a half-off sale at the San Diego Science Center, which leads me to believe they were being discontinued.

Gabe & Audrey The poster you reproduced makes me wonder what the coming generation of scientists is going to be like. I'm afraid to ask what "Al" uses for an amp...

The book by Janwillen van de Wetering which I have (back in New Jersey) is **Inspector Saito's Small Satori**, a collection of short detective stories set around Tokyo, I believe. I may have read his book about his experiences in a Zen monastery (unless I'm now totally confused), but if the book exists and I did read it, that was about fifteen years ago.

The last mystery stories I read, just this past year, were the ten "Martin Beck" novels, translated from Swedish and about a homicide detective operating out of Stockholm. (I bought the series years ago solely on Rolf's recommendation and finally got around to reading them.) What makes these stories distinctive is that they take place over the course of a decade or so and the characters' lives change in a credible fashion; not all of the recurring characters are likeable, but they all have some redeeming traits (well, except maybe for the police bureaucrats). One of my favorites has to be **The Locked Room**, which ends in what I can only call an "anti-solution:" Beck's unraveling of the mystery is utterly rejected by his superiors as implausible (though it **is** correct) and the murderer ends up in prison for a crime he had nothing to do with. (Telling you this should not ruin the book for you...)

Rod I haven't met anyone yet who's had much positive to say about NolaCon. Doug Hosto (fellow ChUSFAn and imminent APA-TECHer) gave me the poop on how the people running the show forgot to talk to the people who were supposed to doing the work ("I thought **you** were guarding the prisoner..."), ultimately requiring almost everything to be thrown together at the last minute. Noreascon should go better: I imagine NESFA is laying in a stock of new whips just now...

I don't recall now whether I discussed this earlier or not, but GD might end up getting the GPS (Navstar) contract we'd lost earlier, because of Delta's payload capacity problems and now because Delta uses solid boosters...

The article in **Defense Science** on Challenger disturbs me a bit, too. AbuTaha's reconstruction of the accident may not be right, but it does point up the fact that there are **many** problems with the Space Transportation System and that NASA may not yet have fixed some of the important ones. The question here that's been bugging me is: what does NASA do after they lose the next one?

It is not surprising that you haven't read a lot about these alternate theories about the accident. Agencies and corporations don't generally like outsiders putting in their unsolicited "two cents' worth," as they tend to feel that they are closer to the problems, have more experience and expertise, and that conflicting views just tend to confuse the issue. There is a grain of truth to this, but I feel that the outsider's perspective is also sometimes valuable in suggesting problems and solutions that merit investigation. My experiences in industry and academia have shown me that there is a fair amount of arrogance in technical communities as well, which tends to reject automatically the views of outsiders, apply conventional "wisdom" on a subject when investigation would be inconvenient, and at times offer answers to questions with a confidence directly proportional to the speaker's unfamiliarity with the topic. (Beware the deadly warning signs of Male Answer Syndrome!) The whole matter has been such a huge embarrassment to NASA that I think they were just anxious to "put it behind them" (one of the most wretched phrases to find currency in the Eighties: rarely have we had so much to put behind) that they wanted the official view generated, promulgated, and on a bookshelf; the less discussion, the fewer reminders to arise...

Yeah, I saw that glow on STS-26 -- who knows anymore if it was a real problem? I doubt that it was (after the last time, you find yourself jumping at **anything**). Still...

Good luck in your pursuit of a new job and with the manual.

Annette Sheesh, I see you too often to say anything new (you may puff and hiss). If I haven't said it already, I do hope your written exams go well. I can well imagine (and remember, even) the torture of preparing for them...

Your passing remark on Mandelbrot's book reminds me to mention Michael Barnsley's new book, **Fractals Everywhere.** (The title makes me want to do parodies of that song from the Sixties: "Fractals in her hair / Fractals everywhere / I love the Fractal Girl / Was she Reality / or just in eight-thirds-D? ...") This looks like the closest thing yet to the how-to book that Dr. Guy told me he was looking for, though it looks like it would definitely help to be of a mathematical bent to read it. Maybe next time, I'll give an annotated bibliography of the items on my Chaos Shelf.

I think the time travel fantasy is a popular one. I couldn't list a simple answer to your questions because my list is pretty long, too. I tend to play this game the other way, though: I think of people from the past I'd like to bring forward to show them the ramifications of their ideas and actions. (You know, of course, that the best way to meet fellow time travellers is to stop off at some major event, such as the Crucifixion, and work the crowd of spectators...)

Bill The favorite science books list is an interesting challenge. My list would have too many technical entries on it to be generally useful for your desired purpose; I'd have to look through library shelves to spot titles that don't come to mind anymore. George Gamow's **Mr. Tompkins** books were favorites of mine as an adolescent; they are pleasant introductions to the ideas of modern physics, from the viewpoint of the dreams of an "ordinary man." **The Physicists** by Cline (sorry, I've lost the first name) discusses the ideas of relativity and quantum theory, but is also filled with anecdotes about the scientists who developed them, revealing them as (almost) regular people who happened to like to think about the Universe; the book is undoubtedly out-of-print and regrettably hard-to-find. I note that you didn't list Feynman's **QED**, who should be accessible to an interested non-specialist: it is a transcription of his four public lectures on the contemporary theory of light and its interaction with matter, a theory he himself was instrumental (and vocal, even) in developing. I find it amusing that two of your three "social sciences" entries deal with frauds, hoaxes, and aberrant behavior (in roughly correct proportion to the population at large?).

Me Obviously, the moving company did eventually find the missing box (allowing me to use this font again). It was delivered here on Election Day, just two months after everything else, and was the one piece of good news I got that day.

Haw! No one, including me, remarked on the fact that the distance scale on my world map is wrong. The circles should be marked in **2500** km increments (label in haste, repent at leisure); the edges of the circles are about **10,000** km from the centers.

APA-TECH 62

Cover The sax player, complete with mushroom cloud, was surgically removed from an ad for radio station KTCJ ("Twin Cities Jazz"), which read "Tune in on Tuesday nights for the latest experiments in fusion." He originally appeared before a sort of smoky, indefinite background -- I decided to jazz things up a little...

Susannah Well, I was finally panhandled by a campus squirrel a couple weeks ago. Around here, they don't have sense enough to sleep all winter, but keep coming out every time it warms up a little. I realized that they have learned to follow people carrying paper bags. When this one came up the steps of the Physics Building with me and stared at me through the glass door, I broke down and gave it a hunk of cookie. Cheez, no thanks or nothin', just wandered off to stuff its face...

Linda It will be nice having you back in the States again. I imagine this must make things difficult for Yas' family, though...

Guy C. I guess I talked to you as well since this issue came out. I hope all is progressing well with your life's plans.

I always did like that Ken Brown cartoon. The postcard of his that I have is "Indolence on Parade," which features a coupla guys shluffing off in an armchair and on a coach, with newspapers and beer cans scattered about, being towed on a flatbed as a parade float.

Bonnie If you want to get good and depressed about things in Russia, you may want to read James Oberg's recent **Uncovering Soviet Disasters**; there's a lot more to worry about than disappearing lakes.

The program I used for the maps is called MAPPLTR, which offers about twenty different map projections. I have never seen the code and have no idea whether it is General Dynamics proprietary.

I probably will still ask you how work is going: the general situation you described was comparable to what we went through when GD was courting GE Astro Division on a Naval satellite contract -- four re-workings of the analysis in ten days (I'd rather have done Europe)...

Barry It's worse than you think: I'm paying **money** for this abuse...
By the way, watch yerself, Kiddo! You're starting to talk like an Editor!

I'll have to come back to this issue for more next time. I have to get some report writing done, so I can pass at least **one** course this quarter. See you here and there in the next few weeks. Stay warm!

Has the community lost *all* sense of decency?!

Scientists Take To The Silver Screen

When movie director Roland Joffé set out to chronicle the dawn of the Atomic Age, he sent out an unusual casting call. Rather than use actors to portray most of the Los Alamos physicists of the 1940s, he decided that only real scientists would do. So he and his crew passed around the word at several universities, and he soon recruited 50 scientists, engineers, and physicians. Actors have the leading roles—Paul Newman is Major General Leslie Groves and Dwight Schultz plays J.Robert Oppenheimer—but the real scientists figure prominently. Caltech professor of theoretical physics, David Politzer, for example, portrays physicist Robert Serber, Oppenheimer's young protege. The film, named "Fat Man and Little Boy" after the bombs dropped on Hiroshima and Nagasaki, is scheduled to be released this fall. But the experience of acting in it is unlikely to convince any of the scientists to leave their labs. Stanford psychology professor Brian Wandel, who agreed out of curiosity to spend several weeks last summer on the movie set in Durango, Mexico, says that his brush with stardom was enough to convince him that he made the right decision when he chose science over show business. Other researchers who will be seen on the screen with Paul Newman include Stanford psychophysics graduate students David Brainard and Allen Poirson, and physician Roger Cubicotti, son of a Manhattan Project chemist. Robert Cornog, former chief engineer at Los Alamos, was recruited to guarantee the authenticity of the bombs, and there is even an appearance by UCLA cancer specialist Robert Gale, who helped victims of the Chernobyl disaster.

Photo: Peter Sorel

TYPECASTING: Politzer portrays a physicist in the film "Fat Man and Little Boy."

Andy proposed casting Tom Hanks as Richard Feynman... umm... I dun..no...